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No. 17

October 26, 1918

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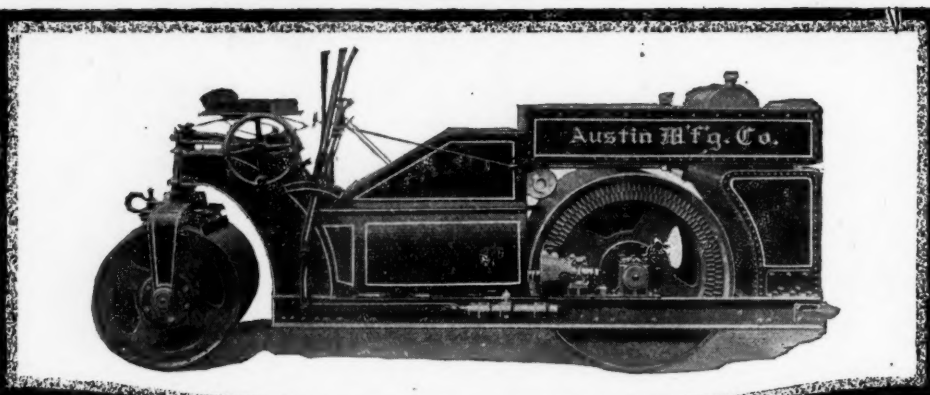
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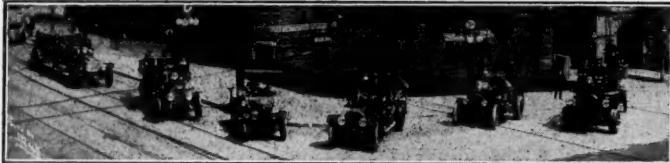
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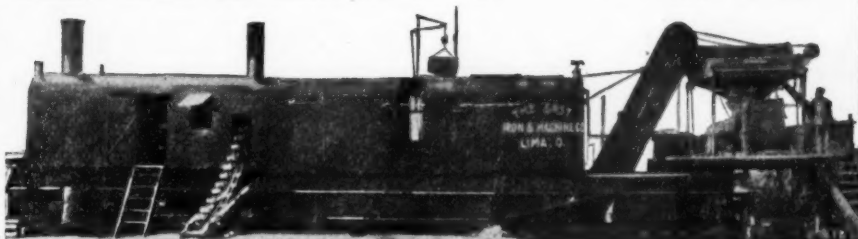
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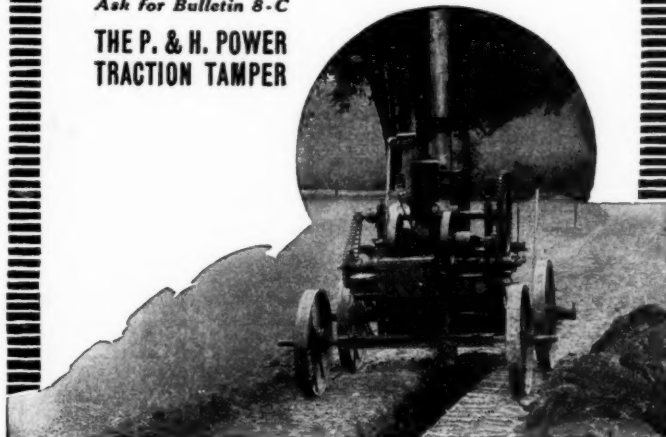
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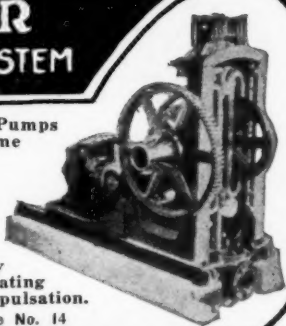
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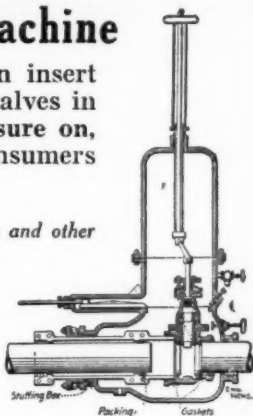
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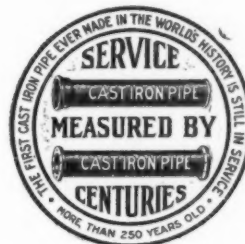
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Municipal Journal

Volume XLV.

NEW YORK, OCTOBER 26, 1918

No. 17

STREET CLEANING IN SAN FRANCISCO

Downtown Streets Swept by Day and Flushed by Night—Sand Spreading—Patrol Cleaning—Refuse Dumps—Districting and Increasing Efficiency of Force.

By CHARLES W. GEIGER.

In cleaning the streets in the business section of San Francisco, the Street Cleaning Department uses sweepers for day work during the dry season, and flushers for night cleaning and sometimes during the day. The sweeping is done with two Elgin pick-up sweepers, which average from 160,000 to 200,000 square yards daily. The machines sweep, pick up and dump at a cost of 11 cts. per 1,000 square yards. The sweepers are operated by two operators and work in two shifts of eight hours each.

It had been the practice to operate the sweepers during the dry season and let them lie inactive during the rainy season, until the superintendent of the Street Cleaning Department designed a sand spreader which could be attached to and operated by them. Now they are employed in spreading sand over the down-town streets during the rainy season and during foggy mornings, thus doing double duty. The sweepers can be converted to sand spreaders in a few minutes by removing the lower rear door of the carrying box, and installing in its place another door which carries the sand spreader. The carrying box is then filled with sand to be spread. The broom of the sweeper is then raised, and the drive chain taken off the broom and applied to the driving pinion, which is attached to a horizontal drive shaft. Geared to this shaft are two vertical shafts which are connected to the sand spreaders by couplings. Three cubic yards of sand is spread over a distance of 35 blocks in two hours. It formerly required as much as a day to properly spread ten blocks by the old horse-drawn spreader.

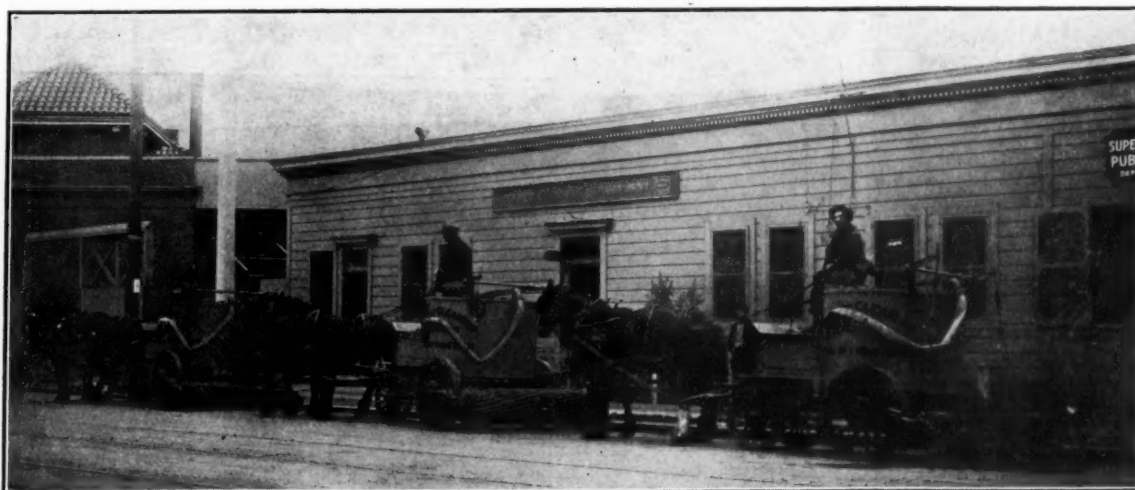
The machine has two speeds, the low speed spreading the sand over a space 12 feet wide, the high spreading 20 feet wide. The entire device is governed from

the seat. The spreader has been endorsed by the City Government Traffic Squad, Humane Society, and the Automobile Association. Before the use of these spreaders, the slippery condition of the streets, resulting principally from oil dropped from automobiles, but also by fog and rain, caused the city officials considerable worry, and it was really at their instigation that the superintendent attempted to solve the problem. In foggy weather the machine is run as a sand-spreader for a couple of hours on the down-town streets. Also it is run over the route of parades a few minutes before the parade starts, which puts the streets in good condition for pedestrians.

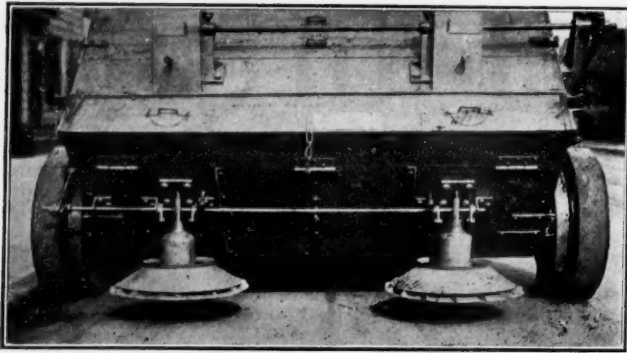
A very dry, sharp sand is used, and is permitted to lie on the street. No annoyance from dust results. The sand absorbs the oil and the auto wheels pulverize the sand into the pavement. After a rain the streets appear perfectly white.

The superintendent of the Street Cleaning Department has also designed a sanitary wagon top for garbage and street wagons. This not only eliminates the ugly sight of material in garbage and dirt wagons but also greatly helps to eliminate the disagreeable odor. All garbage and dirt wagons operating in the down-town section are equipped with this top. The whole is supported by a free beam which sits in the wagon bed. There are four lids similar to a roll-top desk, which can be opened from either side and can easily be taken off and cleaned, which is done frequently.

A Kelly-Springfield motor flusher is used in flushing the streets in the down-town section for eight hours during the night, and sometimes as occasion demands the flusher is operated during the day. It flushes a space up to 24 feet wide, depending upon the pressure, which



SQUEEGEE MACHINES USED BY SAN FRANCISCO STREET CLEANING DEPARTMENT.



SAND SPREADERS ATTACHED TO SWEEPER.

is provided by a pressure pump placed on the right side of the truck just above the rear wheel. Power is supplied to the pump from the motor. The tank has a capacity of 1,500 gallons. In order to protect the operator from being struck by automobiles while working on the crowded streets at night, a safety guard has been designed, consisting of a heavy piece of structural iron attached to the frame of the flusher, and extending entirely around the operator, protecting him from being hit from the rear or the side and giving him a feeling of safety at all times.

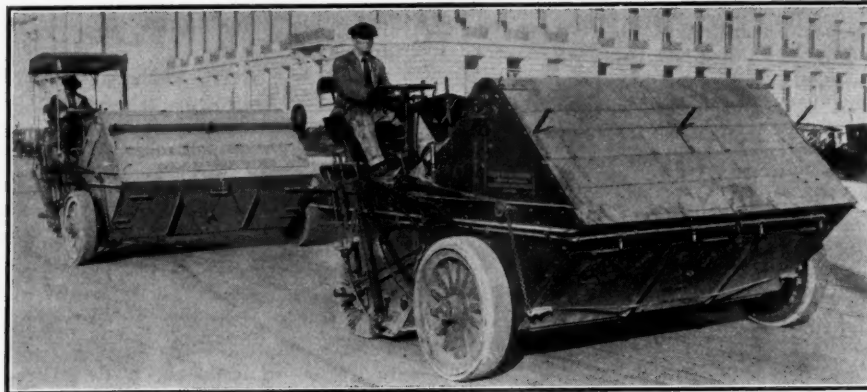
An auto-educator is operated in the down-town section

the can. When the can becomes full it is set off at a convenient point and picked up by the wagon.

For street sweeping purposes the city is laid out into fifteen districts, with a crew to each district, consisting of four men and two teams. The sweepers are paid \$4.00 for eight hours work, this being a new schedule. Contractors furnish the 55 double and 2 single teams used by the department at \$8 per day for double teams, the contractors paying the driver. There are 137 sweepers and 17 gang foremen in the Street Sweeping Department at present. The foremen receive \$4.50 per day. There are 352 blocks in the down-town section, which is taken care of by the block system. Eighty of the 137 sweepers work on the block system and clean from 7,000 to 14,000 square yards daily. The total number of blocks cleaned daily by all classes of sweepers averages from 800 to 900. During the summer an average of 2,400 loads per month are hauled from the streets, which is approximately 5,400 cubic yards of dirt.

The street sweeper foremen report to the office of the superintendent each morning for orders, but all sweepers report on the job, increasing the efficiency 30 per cent over the old method by which all the sweepers used to report to the office of the superintendent.

There are three dumps. The hauls to the dumps average from 2½ to 3 miles. Each wagon averages from



STREET SWEEPERS USED BY STREET CLEANING DEPARTMENT.

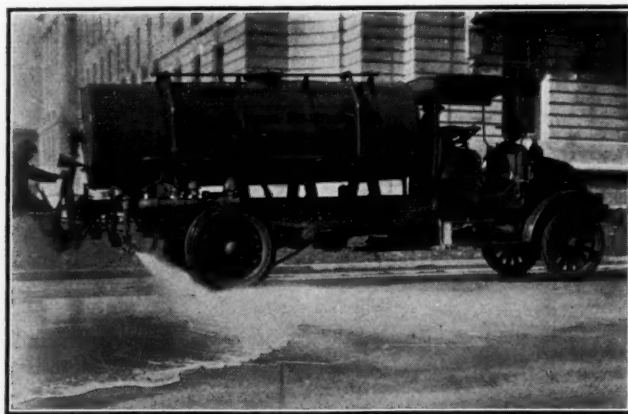
daily, cleaning from the catch-basins the mud that has been washed there by the flusher. The auto-educator generally follows the route of the sprinkler. Both of these machines are doing very efficient work, and have made a great saving in the cost of cleaning streets since being placed in operation. An average of 40 basins are cleaned in eight hours, there being three men to the crew. The tank of the educator holds five yards and is dumped about three times daily. The silt and mud are used to fill in low land.

The Street Cleaning Department has installed waste-paper cans on the principal corners of the principal downtown streets with the words "Help Keep Your Streets Clean," inviting the public to place paper in the cans instead of throwing it on the street. Good results were soon attained. The cans consist of an outer steel shell with a sanitary waste bag attached on the inside near the top by hooks. There is a hinged lid with a large opening on top, making it easy to stuff a newspaper in. The bags are taken out and washed occasionally.

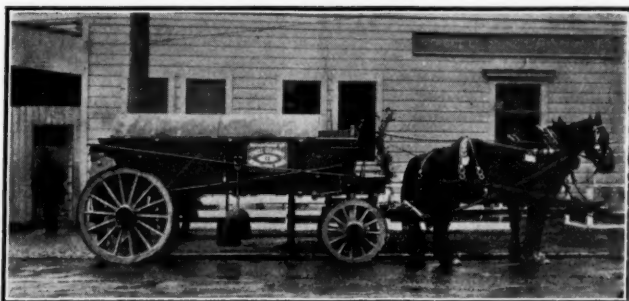
The department has installed sixty "Matchless" street cleaning buggies, and since their introduction the efficiency of the sweepers who are using them has been increased 50 per cent. and the work is easier on the men. These are used wherever possible, principally on smooth paved streets. The men sweep into a pan attached to the can, and when it is full it is raised and dumped into

3 to 5 loads daily. All the dumps are used for filling in land. A watchman is stationed at each dump to sign the trip card given him by the teamster. The signature of the watchman is one check on the load, another being furnished by the signature of the foreman on the job.

It is said that San Francisco has the smallest per capita appropriation for street cleaning of any city in the United States, but at the same time the streets are kept in excellent shape. The sweepers themselves take



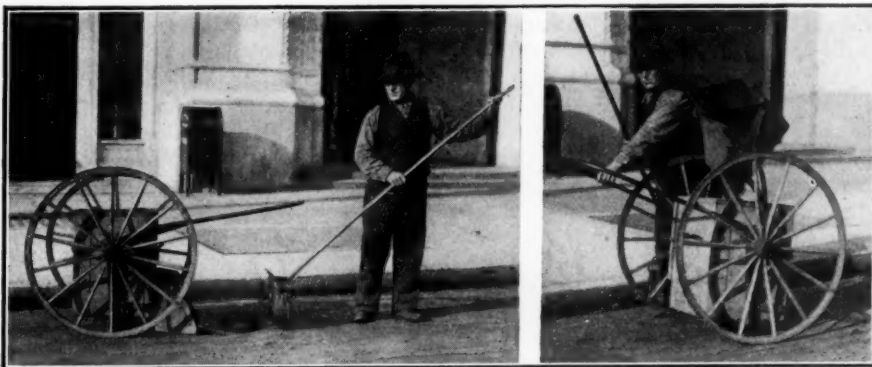
MOTOR FLUSHER IN ACTION.



GARBAGE AND DIRT WAGON, SHOWING STEEL TOP.

a great interest in their work, often starting to work early in order to be sure of getting over their territory.

Because of the good system and many innovations that have been introduced in the department, more territory is taken care of at the present time with 137 sweepers and 55 teams than was taken care of in 1912 with 157 sweepers and 67 teams.



STREET CLEANING BUGGY USED ON SAN FRANCISCO STREETS.

MOTOR APPARATUS IN BUFFALO STREET DEPARTMENT *

By WILLIAM F. SCHWARTZ †

Sweepers.—The city of Buffalo at the present time has two Elgin motor sweepers. These sweepers were bought and placed in operation on Oct. 1, 1916, replacing six horse-drawn sweepers and two sprinkling wagons. They work two shifts, 8 hours each per day, namely 3 a. m. to 11 a. m. and 4 p. m. to 12 p. m. They are a combination sprinkler, sweeper and pick-up, being equipped with a 200-gallon tank, large circular broom and 1½-cu. yd. box. The motor power is a 45-h. p. engine.

During the fiscal year ending June 30, 1918, they cleaned approximately 72,000 great squares (a great square consists of 10,000 square feet). We find they did the best work on smooth pavement, and that the cost per great square was about 2c lower than in horse-swept districts. On account of the abnormal times, we have had considerable trouble in getting competent drivers, consequently the machines have not been worked as satisfactorily as under normal conditions.

*Paper before the American Society of Municipal Improvements.

†Street Commissioner of Buffalo, N. Y.

Flushers.—During the past year three motor street-flushing equipments were installed by the department to replace the old method of flushing and in some districts street cleaning.

In constructing and designing this equipment the department took into consideration—1st, cost of equipment; 2nd, length of time of service; 3, operation and maintenance; 4th, size.

From the above we specified a five-ton tractor with power-take-off from transmission to pump that delivers pressure for flusher; a trailer with 2,000-gallon tank capacity set upon the fifth wheel or tractor. Tractors in operation are the five-ton Pierce-Arrow of standard design, with exception of power take-off of 15 h. p. and are geared 41 to 1. The tractors are equipped with dual 36-inch tires rear and single front.

The trailers and pumps are manufactured by Chas. Hvass & Co., of New York City, and are provided with cylindrical tank, four nozzles which are controlled from driver's seat, centrifugal pump driven from power take-off, also controlled from driver's seat. The pump creates a pressure of 35 lbs. (this pressure can be increased or decreased). We find that 35 lbs. will not injure the pavement and at the same time does cleanly work. When the street is very dirty we use the four nozzles, which gush 525 gallons per minute, but as a rule only use two nozzles which flow 150 gallons per minute. During the process of flushing, tractor runs at a speed of 4½ miles per hour, running empty 14 miles; weight of tractor and flusher when full 18 tons, when empty 10 tons.

During the winter season the trailers are removed from tractors, and the tractors are placed in operation in snow work, also hauling trailers for ash and garbage districts. We estimate during the past winter that these three tractors saved the city at least \$15,000 in snow work alone. A great many of our streets in the outlying



AUTO-EDUCTOR REMOVING STREET FLUSHINGS FROM CATCH-BASIN.

districts became drifted and it was an utter impossibility for the city to get labor to take care of same, notwithstanding the fact that we placed every available prisoner which we could commandeer from the penitentiary. We equipped the tractors with Good Road snow plows and found they did excellent work.

The cost of operation per day (which includes operating charges, maintenance and fixed charges) for a 16-hour day we found to be \$24.96; during the winter months this cost increased \$2.00 per day on account of more gasoline and oil being used by being forced to run low gear the greater part of the time on account of bucking heavy drifts of snow.

Under the old system of flushing with portable line hose the cost per great square for 10,000 square feet was \$1.40. We experimented with the two-man reel (used in New York City) and found the cost to be 56c. The motor equipment reduced the cost to 20½c per great square; this includes everything, such as operating labor, supervision and pick-up wagons.

The city has contracted for three additional flushers, and it is the intention of the department as soon as financial conditions warrant eventually to do away with all horse-drawn sweepers and sprinklers and flush the entire town with the exception of cobblestone and macadam pavements, as we find the cost per great square for sweeping is \$0.278 and that of flushing is \$0.205, it not only being more economical but leaves the streets in a more cleanly condition besides being more sanitary.

Refuse Collection.—For two months we demonstrated with trailers and tractors in the Ash and Garbage Division and found we could cut the expense approximately 25 per cent, also getting greater efficiency. The system followed in the demonstration was to start empty trailers drawn by horses from various barns to the different districts. When these trailers were loaded, to have tractors with train of four empty trailers drop off same, taking up loaded trailers and proceed to dump or reduction plant, continuing this operation until districts were cleaned up.

At the present time we have six Ford motor trucks in operation in the Ash and Garbage Division. These trucks have a capacity of four yards, but have only been in operation for four months, consequently we cannot get a definite line upon the maintenance and depreciation. The class of drivers we are able to get are inexperienced (being mainly boys of 17 to 19 years of age) so that these trucks are often laid up for repairs. In the writer's opinion this form of truck is too light in weight for collecting ashes, for the reason that the dumps through which they have to go have a tendency to badly jar the entire machinery on account of their light construction.

It is the intention of the department after we have won the war to motorize the entire Ash and Garbage Division. This would have been done at the present time, but we find it is an utter impossibility to obtain competent drivers; also, the cost of equipment is 40 per cent to 50 per cent higher than it would be during normal times.

GARBAGE AND REFUSE DISPOSAL DATA

About five years ago Paterson, N. J., began the operation of a Heenan destructor plant for burning its municipal wastes; which plant was described in the March 12, 1914, issue of Municipal Journal. This plant is now receiving and caring for nearly the full amount of material for which it was designed (60 tons in 24 hours) and provision will have to be made very shortly for disposing of additional waste due to the growth of the city, either by

an addition to the destructor plant or by a plant of another kind.

In order to obtain an idea of the capacity and cost of operating other incinerating plants in service in other cities, H. J. Harden, city engineer of Paterson, has collected information on these points by means of a questionnaire. Through his courtesy we are able to print herewith, in tabulated form, the replies received from thirty-seven cities in the United States and Canada.

REFUSE INCINERATING PLANTS AND THEIR OPERATION.

Compiled by H. J. Harden, City Engineer, Paterson, N. J., Sept. 23, 1918.
(Continuous Table—Cities and Population Being Repeated.)

City.	Population.	Name or Design of Disposal Plant.	Kind of Disposal Plant.	No. of Furnaces.	Size of Furnaces.	When was Plant Built?	What was the Original Cost?
Virginia, Minn.	18,000	Decarie	Decarie	2	....	1909	\$25,000
Duluth, Minn.	100,050	Decarie	Incinerator	2	....	1905	....
Portland, Ore.	311,351	Fred P. Smith	Incinerator	8	8'x14' 6"x15'	1910	99,900
Milwaukee, Wis.	460,000	Heenan & Froude	Continuous grate destructors	..	....	1910	212,000
Chicago Heights, Ill.	25,000	McGuire	Incinerator	..	....	1911	14,000
South Bend, Ind.	70,000	Dixon incinerator	25-ton crematory	..	....	1906	....
Oil City, Pa.	21,000	Davis incinerator	Incinerator	1	11'x20'	1902	8,500
Seranton, Pa.	165,000	Lewis & Kitchen Furnaces.	Incinerator	4	18'x18'	1910	25,000
Huntington, Ind.	15,000	Smith	Incinerator	2	8'	1912	3,500
Paterson, N. J.	125,000	Heenan	Destructor	4	20' 6"x6'x6'	1912	79,000
Easton, Pa.	30,000	Morse-Boulger	Incinerator	2	....	1911	14,000
Allentown, Pa.	70,000	Dixon Garbage Crematory Co.	Crematory	2	....	1902	15,000
Marion, O.	30,000	Walker	Incinerator	1	Grate area 108 sq. ft.	1905	15,000
North Braddock, Pa.	20,000	Decarie Incinerator	Natural draft 125-ft. stack	1	8'x8'x10' high	1912	28,000
Trenton, N. J.	130,000	Davis Garbage Furnace Co.	Incinerator	4	9'x9'x8' high	1901	35,148
Lancaster, Pa.	50,000	Davis	Incinerator	3	....	1902	....
Covington, Ken.	56,000	Dixon	Crematory	1	5'x8'x35'	1898	....
Berkeley, Cal.	70,000	Sterling	High temperature top feed } Mutual assistance type }	3	....	1913	60,000
San Francisco, Cal.	550,000	Thackeray (privately owned and operated)	Destructor	32	....	1897	Not known
Richmond, Va.	150,000	Ben Boulger	Crematory, brick	..	....	1909	10,000
Petersburg, Va.	45,000	Decarie	Steel water jacket plant	..	....	1910	40,000
Cairo, Ill.	15,000	Incinerator Decarie	Incinerator	1	....	1913	25,000
Norfolk, Va.	95,000	McGuire	Incinerator	2	....	1915	5,540
Greensboro, N. C.	20,000	Nye Odorless	Incinerator	4	14'x14'	1917	14,000
Charlotte, N. C.	50,000	Nye Odorless	Incinerator	2	4'x8'	1915	3,500
Wilmington, N. C.	32,000	Decarie	Incinerator	4	20'x30'	1914	22,000
Pasadena, Cal.	46,000	Smith	Incinerator	1	10'x10'x14'	1913	35,000
Santa Monica, Cal.	14,000	Decarie	Incinerator	8	....	1912	46,000
Montgomery, Ala.	40,000	Decarie	Incinerator	2	....	1908	....
Savannah, Ga.	80,000	Heenan & Froude	High temperature incinerator	4	20 ft. sq.	1913	126,000
Pensacola, Fla.	31,945	Nye Odorless	Crematory	1	15'x18'	1913	3,500
Moose Jaw, Canada	20,500	Heenan & Froude	Hopper feed, forced draft	3	6' long, V shape, 3' at top	1911	45,900
Vancouver, Canada	102,550	Fred Smith	Destructor, top feed	8	7'x7'x12'	1911	51,000
Ottawa, Canada	110,000	Heenan & Froude	Hopper feed, forced draft	3	9' 3"x2' 6"	1912	35,000
Montreal, Canada	590,000	Thackeray	Incinerator	12	12'x6'	1894	41,000
London, Canada	58,600	Heenan & Froude	Incinerator, high temp. top feed	3	Trough	1913	39,500
Windsor, Canada	28,000	Canadian Incinerator Co.	Incinerator, forced draught	5	....	Renewed 1917	23,000
						Additional	16,000

REFUSE INCINERATING PLANTS AND THEIR OPERATION—(Continued).

City.	Popula- tion.	Does Plant Operate Satisfac- torily?	Are There Any Objection- able Odors?	Nature of Refuse Disposed of	Is Refuse Sep- arated?	Is Fuel Needed in Addition to Garbage & Refuse?	Fuel. Amount per Month.	Kind.
Virginia, Minn.....	18,000	Yes	No	All waste materials except cans, glass and manure	Yes	Yes	5 loads 4 to 6 tons	Slabs Ccal
Duluth, Minn.....	100,000	No	No	Mixed garbage	No	No	.....	.....
Portland, Ore.....	311,351	Yes	No	Garbage and refuse	Yes	No	.....	.....
Milwaukee, Wis.....	460,000	Yes	No	Garbage, mixed refuse and ashes	No	{ Ashes and Coke	65% 25% 6%	Garbage Ashes Refuse Coal
Chicago Heights, Ill...	25,000	Yes	No	Garbage and rubbish	No	Yes	2 tons per week	Coal
South Bend, Ind.....	70,000	Small	No	Household garbage	No	Yes	.....	.....
Oil City, Pa.....	21,000	No	Yes	Mixed refuse	No	Yes	About 200 lbs. coal per ton refuse	.....
Scranton, Pa.....	165,000	Yes	No	Garbage, refuse & waste	No	Yes	2 tons daily buck- wheat coal	.....
Huntington, Ind.....	15,000	Yes	No	Garbage, animals & waste	No	Yes	11 1/4 tons	Coal
Paterson, N. J.....	125,000	Yes	No	Garbage and refuse	No	No	.....	.....
Easton, Pa.....	30,000	Yes	No	Garbage and rubbish	No	Yes	\$177.37 monthly	Fuel
Allentown, Pa.....	70,000	No	Yes	Garbage	No	Yes	\$133.00 monthly	Mine gas coal
Marion, O.....	30,000	Yes	No	Mixed	No	Yes	3,000 ft. per ton	Gas
North Braddock, Pa...	20,000	Yes	No	Garbage and animals	No	Yes	1 bu. per ton	Coal
Trenton, N. J.....	130,000	Yes	No	Garbage and refuse that will burn	No	Yes	16 1/2 tons	Bituminous coal
Lancaster, Pa.....	50,000	Yes	Some	Garbage	No	Yes	.....	.....
Covington, Ken.....	56,000	Yes	No	Garbage & Butchers' offal	Yes	Yes	\$250.00 monthly	Gas
Berkeley, Cal.....	70,000	Yes	No	Mixed	{ Tin cans Removed	No	2 cu. yds. per day	Sawdust Scrap wood
San Francisco, Cal....	550,000	No	Yes	General refuse of the city	No	Yes	Small quantity	.....
Richmond, Va.....	150,000	Yes	Yes	Vegetable matter	No	Yes	.....	.....
Petersburg, Va.....	45,000	Yes	Yes	Garbage and refuse	No	No	.....	.....
Cairo, Ill.....	15,000	Yes	No	Garbage and dead animals	Yes	Yes	.....	Coal
Norfolk, Va.....	95,000	Yes	No	Garbage and refuse	No	No	.....	.....
Greensboro, N. C.....	20,000	Yes	No	Paper, etc.	No	No	.....	.....
Charlotte, N. C.....	50,000	Yes	No	Garbage, trash, dead ani- mals, etc.	No	No	.....	.....
Wilmington, N. C.....	32,000	Yes	No	Garbage, trash, dead ani- mals, etc.	No	Yes	4 cords per month	Wood
Pasadena, Cal.....	46,000	Fairly	No	Garbage and refuse	Yes	No	1/4 ton per month	Coal
Santa Monica, Cal.....	14,000	...	No	Is not used for burning garbage, refuse, dead animals, etc.	Yes	Yes	Occasionally	Crude oil
Montgomery, Ala.....	40,000	Yes	No	General	No	No	.....	.....
Savannah, Ga.....	80,000	Yes	No	Garbage, rubbish, ashes, manure	No	No	.....	.....
Pensacola, Fla.....	31,945	Yes	No	Dead animals, household rubbish	Yes	Yes	8 cords	Lightwood
Moose Jaw, Canada....	20,500	Yes	No	Household, trade refuse and manure	No	No	.....	.....
Vancouver, Canada....	102,550	Fairly	No	Household, trade refuse and manure	Yes	Yes	.....	.....
Ottawa, Canada.....	110,000	Yes	Yes	Garbage, ashes, paper, etc.	No	Yes	To start fire only in winter	Wood
Montreal, Canada.....	590,000	Yes	No	Garbage, refuse & rubbish	No	No	.....	.....
London, Canada.....	58,600	Yes	No	Garbage and refuse	From ashes	No	.....	.....
Windsor, Canada.....	28,000	Yes	At times	Garbage and rubbish	No	No	.....	.....

City.	Popula- tion.	Capacity of Plant for 24 Hours "Tons."	Number of Hours Operated Per Day.	Average Amount of Refuse Disposed of Per Day "Tons."	Number of Men Employed at Plant.	Number of Shifts Worked Per Day.	Number Men in Each Shift.	Wages of Men Employed at Plant.			Other Cost Per Day.	Total Cost Per Day.
Virginia, Minn.....	18,000	25	8	10 to 14	2	1	2	\$135.00*	.....	\$115.00*	.....	.....
Duluth, Minn.....	100,000	50	10	Summer 15 Winter 8	6	3	..	100.00*	\$80.00*	75.00*	\$2.40	.....
Portland, Ore.....	311,351	150	24	July, 3 1/2	9 to 10	3	2 to 5	4.37	4.00	3.75	1.50	\$38.50
Milwaukee, Wis.....	460,000	300	Wk. day 24 hr. Sunday 16 hr.	225	70	3	23	115.00*	90.00*	70 to 85*	.....	160.00
Chicago Heights, Ill...	25,000	10 to 12	Summer 24 hr. Winter 16 hr.	8 to 10	2 to 3	3 & 2	1	85.00*	.....	75.00	None	.....
South Bend, Ind.....	70,000	..	..	..	..	..	..	.....	.....	.....	.....	.....
Oil City, Pa.....	21,000	24	Winter 12 Summer 24	15	Winter 1 Summer 2	1	1	.....	.....	35.25*	4.50	28.85
Scranton, Pa.....	165,000	100	8	80	7	1	7	.....	70.00	.....	Fuel	12.00
Huntington, Ind.....	15,000	44	8 to 10	8	1	1	1	.....	.....	.....	.....	30.50
Paterson, N. J.....	125,000	60	16	50	8	2	3 & 4	4.25†	.....	3.50†	.....	55.00
Easton, Pa.....	30,000	35	10 to 24	16 1/2	2 to 5	1 & 2	2 & 5	73.50*	63.00*	2.90†	.....	.....
Allentown, Pa.....	70,000	25	12	25	2	1	2	.....	3.45†	.....	.28	.....
Marion, O.....	30,000	10	8	4 to 5	1	1	1	.....	3.85†	.....	2.40	6.25
North Braddock, Pa...	20,000	20	8	..	1	..	..	100.00*	.....	.....	.....	.....
Trenton, N. J.....	130,000	65 to 70	Winter 11 Summer 24	25 65	2 to 4 6 to 8	1 2	2	.....	3.25†	.....	.85	.....
Lancaster, Pa.....	50,000	50	..	..	..	..	..	.....	.....	.....	.....	.....
Covington, Ken.....	56,000	30	20	30	4	2	2	.....	3.00†	.....	.....	.....
Berkeley, Cal.....	70,000	48	7 1/2	22	3	1	3	140.00*	115.00*	.....	1.43	.....
San Francisco, Cal....	550,000	600	20 to 22	350 to 400	50 to 60	2	40 & 20	3.50 to 4†	3 to 3.50†	.....	?	?
Richmond, Va.....	150,000	50 each	24 & 9	..	3	1	3	3.30†	3.02 1/2†	3.02 1/2	.....	.....
Petersburg, Va.....	45,000	25	12	20	3	1	..	125.00*	100.00*	75.00*	.....	.....
Cairo, Ill.....	15,000	24	12	12	1	..	..	.....	17.50\$	.....	.....	.....
Norfolk, Va.....	95,000 each unit	60 tons	9	30	..	..	..	3.40†	.....	3.25†	.27	.....
Greensboro, N. C.....	20,000	8 to 10	10	2	1	1	..	.....	2.50†	.....	None	2.50
Charlotte, N. C.....	50,000	60	12	30	1	1	..	.....	60.00*	.....	.....	2.33
Wilmington, N. C.....	32,000	50	10	30 1/4	4 to 5	1	..	25.00\$	18.00\$	15.00\$	.93	15.00
Pasadena, Cal.....	46,000	80	8	9	2	1	2	105.00*	100.00*	.....	3.83	11.00
Santa Monica, Cal.....	14,000	60	8	25	2	..	..	90.00*	.....	.....	.....	12.00
Montgomery, Ala.....	40,000	120	12	25	5	3	..	100.00*	8.00†	1.50†	.....	.....
Savannah, Ga.....	80,000	130	24	75	18 to 22	3	7	4.50†	2.50†	2.00†	.....	.....
Pensacola, Fla.....	31,945	16 to 20	8	8 to 10	2	1	2	.....	.....	75.00*	.....	8.00
Moose Jaw, Canada....	20,500	50	10	15	3	1	3	5.50†	4.50†	3.75†	2.50	16.25
Vancouver, Canada....	102,550	80	16	28	8	2	4	.75†	.50†	.49%†	.....	28.00
Ottawa, Canada.....	110,000	75	8	35	5	1	5	100.00*	280.00*	288.00*	2.25	17.89
Montreal, Canada.....	590,000	200	10	85	23	1	25	.....	2.80†	2.80†	3.51	67.91
London, Canada.....	58,600	50	8 to 24	25	Vary	..	5	3.85†	3.30†	3.30†	.....	22.00
Windsor, Canada.....	28,000	25+	9	21 to 22	2	1	2	.....	.....	.....	1.00	7.70

*Per month. †Per day. \$Per week. ‡Per hour.

REFUSE INCINERATING PLANTS AND THEIR OPERATION—(Concluded).

City.	Population.	Total Cost Includes	Amount of Residue "Tons."	Nature of Residue.
Virginia, Minn.....	18,000	.....	..	Ashes
Duluth, Minn.....	100,000	\$5,580 per annum wages	..	.....
Portland, Ore.....	311,351	Labor and supplies	20	Clinkers, ashes, cans
Milwaukee, Wis.....	460,000	All operations from delivery at plant until the residue is delivered at dump	..	Clinkers, ashes, cans
Chicago Heights, Ill.....	25,000	.....	½ cu. yd	Fine ash
South Bend, Ind.....	70,000	.....	?	Ashes, tins and cans
Oil City, Pa.....	21,000	Wages, repairs and coal	?	Ash
Scranton, Pa.....	165,000	Wages of stokers and fuel	?	Ash
Huntington, Ind.....	15,000	Two men with teams to collect garbage and one furnace tender	1½	.....
Paterson, N. J.....	125,000	Labor and bills	6	Clinkers and ash
Easton, Pa.....	30,000	Labor, fuel, supplies and repairs	..	Clinkers
Allentown, Pa.....	70,000	Fuel and labor	..	.....
Marion, O.....	30,000	Fuel and labor	..	Glass, cans and ashes
North Braddock, Pa.....	20,000	.....	..	.....
Trenton, N. J.....	130,000	.....	..	Cinders, tin cans, bottles
Lancaster, Pa.....	50,000	.....	..	.....
Covington, Ky.....	56,000	.....	..	Cinders and tin cans
Berkley, Cal.....	70,000	Water and electric power	5	Clinkers, tin cans, metal waste
San Francisco, Cal.....	550,000	.....	100	Ashes and tin cans
Richmond, Va.....	150,000	.....	?	.....
Petersburg, Va.....	45,000	.....	?	Ash and clinkers
Cairo, Ill.....	15,000	.....	..	.....
Norfolk, Va.....	95,000	Labor, water and lights	..	Ashes and tin cans
Greensboro, N. C.....	20,000	.....	?	Ashes
Charlotte, N. C.....	50,000	Labor	..	.....
Wilmington, N. C.....	32,000	Labor, fuel, supplies and repairs	2½	Ashes, cans, incombustibles
Pasadena, Cal.....	46,000	Salaries, electricity, water, hauling ashes, Oil	1	Ashes
Santa Monica, Cal.....	14,000	.....	..	.....
Montgomery, Ala.....	40,000	.....	..	Clinkers
Savannah, Ga.....	80,000	.....	32½	Clinkers, ashes, tin cans
Pensacola, Fla.....	31,945	Everything directly connected with plant	?	Tin cans, glass, ashes, etc.
Moose Jaw, Canada.....	20,500	Removal of residue & general maintenance	2 to 3	Heavy slag, clinkers and cans
Vancouver, Canada.....	102,550	.....	7	.....
Ottawa, Canada.....	110,000	.....	..	Clinker
Montreal, Canada.....	590,000	Wages and maintenance.	5,687	Ashes and clinkers
London, Canada.....	58,600	Repairs to machinery, operation, etc.	?	Clinkers and fine ash
Windsor, Canada.....	28,000	.....	..	Tins, bottles, glass, ash

City.	Population.	Disposition of Residue.	Value of Residue.	Is Steam Generated?	What Amount?	Is Steam Generated Used for Power, for Lighting or Other Purposes? To operate fan
Virginia, Minn.....	18,000	Filling in lowland	.....	Yes	.....	.....
Duluth, Minn.....	100,000	Filling in lowland	.....	No	.....	.....
Portland, Ore.....	311,351	Part of ashes sold for fertilizer, rest used for filling lowland	\$5.00 to \$7.00	Yes	100 HP.	Heating and operating forced draft fans
Milwaukee, Wis.....	460,000	Land filling	.....	Yes	Boilers 4-200 HP.	Yes. See report.
Chicago Heights, Ill.....	25,000	Dumped	None	Yes	.....	No
South Bend, Ind.....	70,000	.....	?	..	.....	No
Oil City, Pa.....	21,000	Fine ash sold for fertilizer, rest dumped	.....	No	.....	.....
Scranton, Pa.....	165,000	.....	Sold at 50c. per gross ton	No	.....	.....
Huntington, Ind.....	15,000	Dumped	\$6.00 per ton screened	No	.....	No
Paterson, N. J.....	125,000	Filling lowland	.....	Yes	.....	Lighting & motor power
Easton, Pa.....	30,000	Deposited on dumps	.....	No	.....	No
Allentown, Pa.....	70,000	.....	.....	No	.....	No
Marion, O.....	30,000	Filling lowland	.....	No	.....	.....
North Braddock, Pa.....	20,000	.....	.....	Yes	.....	No
Trenton, N. J.....	130,000	Dumping ground	.....	No	.....	.....
Lancaster, Pa.....	50,000	.....	.....	No	.....	.....
Covington, Ken.....	56,000	Removed to dump	.....	No	.....	No
Berkeley, Cal.....	70,000	Metal waste sold, other for filling in	.....	Yes	100 HP.	For cleaning purpose. Not for power.
San Francisco, Cal.....	550,000	For filling	?	No	.....	.....
Richmond, Va.....	150,000	Filling lowland	None	Yes	Enough to operate plant	No
Petersburg, Va.....	45,000	Filling lowland	None	Yes	.....	No
Cairo, Ill.....	15,000	.....	.....	.....	.....	.....
Norfolk, Va.....	95,000	Taken to dumps	None	No	.....	.....
Greensboro, N. C.....	20,000	Filling lowland	None	No	.....	.....
Charlotte, N. C.....	50,000	.....	?	No	.....	No
Wilmington, N. C.....	32,000	Filling lowland	?	Yes	70 lbs.	To operate blower
Pasadena, Cal.....	46,000	Filling lowland	None	No	.....	.....
Santa Monica, Cal.....	14,000	.....	?	..	.....	.....
Montgomery, Ala.....	40,000	Fueling purposes	.....	No	.....	.....
Savannah, Ga.....	80,000	Filling lowland	4 to 6c. per ton	Yes	To save \$8,000 to \$9,000 worth of coal	For water works pumping station
Pensacola, Fla.....	31,945	Filling lowland	?	No	.....	No
Moose Jaw, Canada.....	20,500	Dumping ground	None	Yes	Zero to 150 HP.	Not at present time
Vancouver, Canada.....	102,550	.....	None	No	.....	.....
Ottawa, Canada.....	110,000	Filling lowland	.....	Yes	125 lbs.	Operate plant
Montreal, Canada.....	590,000	Filling lowland	.....	No	.....	.....
London, Canada.....	58,600	River bank protection	?	Yes	100 HP.	Driving fan for forced draught and heating hospital
Windsor, Canada.....	28,000	Used for fill	None	No	.....	No

WATER WASTE ELIMINATION.

The methods employed in keeping down waste of water at Oak Park, Ill., were described by H. P. T. Matte, superintendent of the water department of that city, in a paper before the Illinois Section of the American Water Works Association and published in the "Journal" of that society. The author named seven classes of measures employed in that city—strict main-

tenance of meters, collection of high bills due to leakage or waste, complaint department to handle complaints caused by high bills, master meter with recording pressure gauges, periodical waste surveys, absolute control by the manager of all divisions of the water department, and no favoritism in enforcing the rules and ordinances.

Oak Park meters all services, including municipal buildings, watering troughs, drinking fountains, street

sprinkling, etc. There is no free water. There is no reduction of bills for leakage, except that if the waste was in the ground and invisible the lowest rate is allowed although the quantity consumed may not justify it.

The complaint department investigates all cases of complaints of overcharging, aiming to satisfy the consumer or at least to obtain the proof for backing up the demand for payment. Record is kept of all complaints in 3x5-inch card files. All calls are recorded on the same size of cards, three colors of cards distinguishing between complaints relative to meters and bills, mechanical division, and delinquent bills. To determine the cause of repeated high bills, the department has evolved a recording detector which is substituted for the meter and which gives a graphic record of the consumption for 24 hours or a week, showing when faucets are opened, the number of baths with the quantity used each time, number of times toilets are used, etc.

Owing largely to the education of consumers by the complaint department, complaints in Oak Park on account of high bills dropped from 2,000 in 1913 to 600 in 1917.

The master meter and recording pressure gauge are especially useful in learning of the existence of and locating leakage, shown by night consumption, and the efficiency of the pumping station attendants and of the pumps. If there is appreciable leakage, a waste survey to locate it is of the utmost importance. The methods described in Municipal Journal for August 3d are employed in Oak Park, and during 1917 that city tested 18 miles of mains and stopped leakage totaling 221,000 gallons a day. This reduced the night consumption to 20 per cent of the average daily consumption.

MILES ACID TREATMENT OF SEWAGE

Conclusion of Report Upon Experiment with This Process—Applicability to New Haven Sewage—Comparison with Imhoff Tanks and Screens.

APPLICABILITY OF THE MILES ACID PROCESS FOR THE TREATMENT OF EAST STREET SEWAGE.

In the first column of Table VI are given tentative estimates of the cost of treating the East street sewage by the Miles acid process. The estimates are based on the production of SO_2 gas by burning sulphur (assumed to cost \$36 a long ton) and on drying from 85 to 10 per cent moisture (coal assumed at \$7.50 per ton).

The possible alternative processes are Imhoff treatment and fine screening, in each case to be followed by disinfection. Cost estimates for these processes also are given in Table VI. We have estimated a very high cost for construction of Imhoff tanks (\$20,000 per million gallons) on account of peculiar local conditions at the outfall, since the tanks would have to be built for the most part below tide water. The cost of chlorination is based on the use of 5 parts of available chlorine per million parts of sewage, an amount which we have found essential for the treatment of either screened or clarified sewage. It is very probable that in actual practice more than 5 parts might be necessary.

It appears from these estimates that the acid treatment of the sewage from the East street outlet should be materially cheaper than either Imhoff treatment or fine screening under existing local conditions. With a fall in the price of grease after the war the outlook would be less favorable. Even if all revenue from the sale of grease and fertilizer were eliminated, however, the cost would not be very much greater for acid than for

Imhoff treatment. Other conditions make the case for the Miles process at this outfall almost irresistible. Our studies have shown that fine screens will remove only a small proportion of the suspended matter from either the East street or the Boulevard sewers, and we are of the opinion that the purification so effected would not be adequate to prevent sludging in the dredged channel into which the effluent must be discharged. On the other hand, our experiments with Imhoff treatment of the East street sewage have been most unpromising. The tank studied produced a fairly satisfactory effluent, but the sludge was highly offensive and never attained the normal character of Imhoff sludge. This is probably the result of the antiseptic action of the copper present in the sewage, which is unfavorable to the success of any biological process of treatment.

Table VI. Estimated Cost of Treatment of East Street Sewage. Dollars per million gallons.

	Miles acid Process	Imhoff-tanks and chlorination	Fine screens and chlorination
Tanks and buildings (interest and depreciation).....	\$2.47	\$5.28	\$4.50
Acid treatment	6.93		
Drying sludge	2.09		
Degreasing sludge	1.78		
Redrying tankage .....	.17		
Superintendence	1.06	.46	.46
Labor on tanks and screens.....	1.00	1.20	1.42
Disposal of sludge or screenings..		1.00	.50
Chlorination		4.05	4.05
Gross cost	15.50	11.99	11.03
Revenue	7.09		
Net cost	8.41	11.99	11.03

Above all, however, the thing that counts most heavily in favor of the Miles process under the conditions obtaining at New Haven, is its freedom from nuisance. If heavy costs for interceptors and pumping are to be avoided, the sewage of the city must be disposed of at four different points, all of them in thickly settled areas where offensive odors must be prevented at all costs. Furthermore the problem of disposal of sludge and screenings would present peculiar difficulties. A process of treatment which would be free from local nuisance and which wholly eliminates the problem of sludge disposal is the ideal one for such a local situation.

APPLICABILITY OF THE MILES ACID PROCESS FOR THE TREATMENT OF BOULEVARD SEWAGE.

Cost estimates for the treatment of the Boulevard sewage are of a somewhat different character. The Miles process is here considerably more expensive, first because of the higher alkalinity of the sewage and second because of the fact that the plant would be smaller (six million gallons) and costs per unit volume therefore larger. In particular the cost of superintendence rises to a high figure since we are convinced that a chemical industry of this nature can not be carried out without expert guidance. The expense of Imhoff treatment is slightly higher for the same reason, in spite of lower construction costs.

The same objections which militate against screens at East street limit the promising possibilities at the Boulevard sewer to Imhoff and acid treatment. The acid treatment shows a lower net cost and would be freer from nuisance. On the other hand, the gross cost of the Miles process is very high and with a new procedure of this sort, never yet applied to purely domestic sewage on a practical scale, it must be recognized that many factors, such as the difficulties in distillation and

the deoxidation of diluting water caused by the contained chemicals, may cut heavily into the assumed revenue.

Table VII. Estimated Cost of Treatment of Boulevard Sewage.
Dollars per million gallons.

	Miles acid process	Imhoff tanks and chlorination	Fine screening and chlorination
Tanks and buildings (interest and depreciation)	\$2.47	\$4.44	\$4.60
Acid treatment	10.74		
Drying sludge	2.04		
Degreasing sludge	1.91		
Redrying tankage .....	.17		
Superintendence	2.65	1.15	1.15
Labor on tanks and screens.....	1.00	1.50	2.05
Disposal of sludge or screenings.		1.00	.50
Chlorination		4.05	4.05
Gross cost	20.98	12.14	12.35
Revenue	11.38		
Net cost	9.60	12.14	12.35

If the problem of the Boulevard sewer stood by itself, we should be somewhat in doubt whether to favor Imhoff or acid treatment, with the facts in hand. Since, however, the case for acid treatment seems so clear for the East street sewer, we are of the opinion that it would be wise to delay construction at other New Haven outfalls until the acid process has been tried out on a practical scale at the point where it promises best results. If an acid treatment plant at East street is successful the drying and degreasing of the sludge from this and other plants could be conducted at one central location, the costs cited in Table VI would be materially reduced, and acid treatment might well prove economical for all the main outfalls of the city.

GENERAL CONCLUSIONS AS TO THE APPLICABILITY OF THE MILES ACID PROCESS.

We have discussed the possibilities of acid treatment in connection with the two main outfall sewers of New Haven in greater detail than might seem justified in a paper on a general method for the disposal of city sewage. We have done this to emphasize the old truth that there is no panacea for the ills with which the sewage expert deals, but that each individual problem must be dealt with on its own peculiar merits.

The following conditions make the Miles acid process peculiarly adapted to the solution of local difficulties in the case of the East street sewage:

- The necessity of locating the plant in a thickly settled district, where treatment on filter beds would be impossible and sludge disposal difficult and the production of offensive odors fatal to success.
- The character of the soil at the outfall, which would make the construction of deep tanks costly.
- The presence in the sewage of antiseptic industrial wastes which would make the results of Imhoff treatment or any other biological process uncertain.
- The necessity for removing an appreciable proportion of finer suspended solids in order to avoid deposition in harbor channels.
- The probable necessity for bacterial purification in order to protect shellfish layings and bathing beaches.

Against the acid process, on the other hand, is the small amount of sludge deposited by the sewage and above all its high content of mineral oil and other unsaponifiable matter. Yet the balance is on the whole clearly in favor of acid treatment.

At the Boulevard outlet conditions (a), (d) and (e) again operate in favor of the acid process and the grease to be obtained is of much better quality. On the other hand, the high alkalinity of the sewage makes acid treat-

ment costly, while Imhoff tanks could be built without difficulty and would not be hampered in their operation by industrial wastes. Treatment by the Miles process would not on the whole seem to be indicated at this outfall taken by itself, but might be advisable as part of a general plan for the city as a whole.

Our experience with New Haven sewage lends no color to the hope that a net financial profit can be obtained by the use of the Miles acid process unless with sewage of exceptionally high grease content and low alkalinity. They do, however, suggest that for communities where clarification and disinfection are desirable—where screening would be insufficient and nitrification unnecessary—the process of acid treatment comes fairly into competition with other forms of tank treatment; and that it is particularly suited for dealing with sewages which contain industrial wastes and for use in localities where local nuisances must be avoided at all costs and where sludge disposal could be provided for only with difficulty.

WATERWORKS OPERATION.

Using Records for Increasing Efficiency—Analyzing Flue Gases—Soot Blowers—Steam Jets—Chain-Grate, Overfeed and Underfeed Stokers.

Records such as those recommended in the previous article can be made extremely useful in securing economy if they are studied and the information derived therefrom utilized for improving details in the plant and its operation. If not used in this way, the time consumed in securing the data and preparing the reports is practically wasted, and if the men realize that the superintendent does not make use of the reports they are apt to consider them of little importance and become careless in keeping them up or enter data which are unreliable or even faked.

On the other hand, the superintendent can encourage the firemen not only to keep the records but also to use their best efforts to increase the efficiency and effectiveness of their operation, by letting them know that he makes careful analysis of the reports and from them learns what firemen are careful and what are careless in their firing. Like other human beings, the average fireman is not likely to continue putting in his best efforts in economizing coal and otherwise operating the plant at high efficiency if he thinks that this is not appreciated or even realized by the superintendent, especially since such efficiency on his part generally involves considerably more labor. It is easier for a fireman to apply twenty-five shovels of coal at twenty-five minute intervals than to fire fourteen shovels at fifteen minute intervals, even though he handles less coal by the latter schedule; but the more frequent firing will generally secure higher efficiency and more uniform steaming. But properly kept records should enable the superintendent to learn whether or not the firing is done at sufficiently short intervals.

The records should also enable him to learn whether the fire is kept thicker than it should be. It is often easier to keep the steam pressure uniform with a fire sixteen or eighteen inches thick than with one half of that thickness, but the thinner fire would generally be the more efficient. The more volatile matter the coal contains, the thinner the fire should be.

Flue Gas Analysis.—Reference has been made to the desirability of making frequent analyses of the flue gases. The cheapest appliance for this purpose is that known as the Orsat apparatus; although if the plant is at all large,

a CO_2 recording apparatus is preferable to the above, because it does not require the time of the firemen or engineer which is necessary with the use of the Orsat, and also because it gives a continuous record, while the other gives the condition only at the time of taking the sample. Moreover, the taking of frequent samples for tests of the Orsat apparatus is very apt to be neglected, especially when the furnace is not worked quite right and the fireman is otherwise occupied, when the records would be most valuable. The recording instrument needs a little attention and should be occasionally checked by an Orsat apparatus. The boiler setting should be tight, since samples are taken in the uptake and any infiltration of air lowers the apparent CO_2 . The best of firemen cannot make a good CO_2 record if the boiler setting leaks.

Engine operators are apt to think that the Orsat apparatus is too delicate or difficult for use by anyone but an expert, but as a matter of fact it is a much simpler instrument and easier to operate than a steam engine indicator, and an engineer of average intelligence should be able to learn how to use one in one or two days. For ordinary apparatus the simple open-end gas sampler is the most convenient to use. It can be made of standard one-quarter inch or one-eighth inch iron pipe placed with the free open end in the center of the gas stream. If placed in the uptake, the opening of the sampler should be so placed that the sample will be affected as little as possible by the damper changes. Where average results are desired, a number of samples taken at frequent intervals can be collected in one bottle and then a single determination made that will give the average efficiency during the entire period.

Fire Room Ventilation.—In the matter of air supply, it may be mentioned that, especially in the winter time, fire rooms are sometimes closed so tightly that sufficient air for feeding the fire does not enter the room and therefore cannot be drawn in by the chimney draft. Fire rooms have sometimes been found where a vacuum of a half-inch to an inch of water column could be found, thus reducing the effectiveness of the plant by that amount, which means the wasting of the heat required to produce that draft if the furnace is being operated efficiently otherwise.

Another precaution is to see that the baffles or flame bridges in the boilers are tight. If they are not tight the hot gas may short-circuit through them to the flue and thus escape to the chimney without giving up to the boiler as much heat as it should.

Stand-by Losses.—In judging of boiler performances by comparing the amount of steam made, or of energy used in pumping water, with the amount of coal consumed over an interval of days or months, allowance should be made for any stand-by losses; for coal used to bank fires when shut down for the night or to start up cold boilers, or to operate boilers at a small fraction of their capacity, would seem to indicate a lack of efficiency and improper firing if considered on the basis of continuous runs at maximum capacity. This is another reason for keeping continuous or hourly records on which to base judgment of a fireman's work rather than gauging it merely by the comparison between amount of water pumped during a month or other period of time and the coal consumed in the same time. It may even be that an increase in the amount of work done may cause an appreciable decrease rather than increase in the coal efficiency, since it may require putting into service for peak-loads during an hour or two each day an additional boiler, which boiler is therefore operated at very low efficiency, its

operation therefore lowering the average efficiency of the entire plant.

Soot Blowers.—Keeping heated surfaces free from soot can be done much more easily with a permanent soot blower than with the ordinary hand lance, and generally with the use of less steam. A soot blower, however, should be selected which is suitable for the boiler in question, since different types of blowers are best suited to certain types of boilers.

Steam Jets.—If a new boiler is to be installed or changes are to be made in the plant, mechanical devices may frequently be introduced that will much more than pay for themselves in saving labor, or increasing the efficiency of the coal, or both. One simple appliance is that of a steam jet for forcing extra air over the fire in order to mix it with the volatile matter from the coal at a point immediately above the fire, thus giving the maximum length of time for complete combustion of the volatile matter. Such jets may be directed from the front wall or through the side walls or even through the bridge wall. They should be used only while the volatile matter is being driven off immediately after firing and should then be cut off until the next charge of coal is applied. Too often the fireman either does not use them at all, in which case their cost has been wasted, or he leaves them on all the time, in which case the steam is wasted and the efficiency is not bettered, and, in fact, may be reduced.

Mechanical Stokers.—Whether a mechanical stoker is worth while or not is a question of balancing interest and depreciation and operating cost against saving in labor and in coal through increased efficiency. In case of large plants that have mechanical means for delivering coal to the stokers and for removing ash, mechanical stokers will save considerable labor. But in small plants where the coal would have to be shoveled into the stokers and the ashes removed by hand, no labor would be saved. Mechanical stokers, however, make it possible to use poor fuels with as high or higher efficiency than is obtainable with better grades of fuel hand-fired; and in such cases the saving in fuel cost may more than balance the overhead cost of the mechanical stokers.

Stokers may be divided into three general classes—Chain-grate, overfeed, and underfeed. Chain-grate stokers consist of an endless chain or belt passing around sprockets at the front and rear of the furnace, the belt being made of short links, sections or bars. Revolution of the sprockets moves the chain continuously and slowly from the front to the rear of the furnace. Coal is fed onto the belt by gravity from a hopper placed at the front of the furnace. While on the belt at the front of the furnace, the coal is under an ignition arch which drives off the volatile matter and ignites it and the solid carbon. Dampers or baffles under different parts of the grate control the admission of air, while other dampers at the rear end prevent excessive leakage of air around the end of the belt. The speed of the belt, amount of coal fed and the draft are supposed to be so adjusted that all of the coal is reduced to ash by the time it reaches the rear end, where it falls over into the ash-pit. (One make of chain-grate stoker was described on page 313 of the October 19th issue.)

Underfeed stokers are built up of troughs with sections of tuyeres between them. These are set on an incline, except that in two makes the grates are horizontal, the coal being pushed up over the sides and end of the trough and the air being forced through tuyere blocks around the trough. One make, the "American," uses a screw for feeding the coal, but the others all use rams. Forced draft is used with all underfeed stokers and they can therefore operate with heavy, thick fires and can burn coking coal satisfactorily, and are smokeless. They

can be forced to very high temperature, and a good quality of fire-brick must therefore be used in the settings of the boiler and grate.

Overfeed stokers may be either front-feed or side-feed. The front-feed stokers have the hopper at the front end of a grate that slopes backward and downward at about 45 degrees, the bars or ledges of the grate tipping and dropping the coal from one ledge to the next, until finally it reaches a small dumping section at the rear, where combustion is completed; this dumping section being dumped by the fireman when considerable ashes have collected. Small coking arches at the front ignite the fuel as it enters the grate and the bright fire below materially assists complete combustion. In side-feed stokers there is a hopper at each side the full depth of the stoker, and pusher plates feed the coal onto bars which slope down to the center, the double grate thus being V-shaped. Alternate bars are rocked at the lower end and pivoted near the top, which rocking moves the coal downward to the bottom of the V, where a clinker grinder drops the ash and clinker into the ash-pit below. These stokers have a full fire-brick arch over the whole of the stoker, serving as an ignition arch, and hot air is delivered from under the coking plates and the haunches of the main arch to the freshly ignited coal.

Comparing these several types of stokers, Charles H. Parker, superintendent of the generating department of the Edison Electric Illuminating Company of Boston, gives the following as the result of his experience and observation:

Chain-grate stokers handle coals high in volatile matter and ash economically and without smoke, and the cost of upkeep is small. These stokers, however, are not suitable for coals low in volatile matter and ash, and with such give poor efficiency and excessive cost for repairs.

Overfeed stokers burn semi-bituminous coal advantageously, the side-feed being more nearly smokeless than front-feed, although both classes are satisfactory from this point of view when not unduly forced.

The underfeed stokers are expensive to install and forced-draft fans have to be maintained, but to offset this the chimneys do not need to be tall and cost of maintenance is not excessive. They can burn the cheaper grades of coal economically and one man can fire three thousand or four thousand horse-power of the inclined type.

REPAIRING MANHOLE COVERS.

Covers to sewer manholes, which are the ones most commonly found under the supervision of municipal departments, are ordinarily round and about twenty-four inches in diameter. Because of their shape and to a certain extent of their small diameter as compared with the maximum length of some other manholes, they are not so often broken by traffic as are rectangular ones on manholes constructed in connection with wire conduits and some other public utilities. Nevertheless, with the increasing use of large and heavy trucks, the danger of breakage of manhole covers is increasing.

For this reason a suggestion made by the *Electrical Review* as to the repairing of manhole heads and covers maintained by electrical companies may be of service to municipal officials as well. This journal states that, while broken manhole covers are comparatively rare, cracked ones are becoming more frequent. Also the frames are sometimes found cracked, which is, we believe, very uncommon with manhole heads.

"The scarcity of metal, the high prices and shortage of labor and delays incident to obtaining deliveries from

foundries, have all acted as incentives to central-station companies to repair their own manhole frames and covers. The above-mentioned defects are readily repaired by welding, using either the oxy-acetylene flame or the electric arc, according to circumstances. Repairs made by welding show considerable saving over the cost of taking the cover or frame to a foundry for repairs or scrapping it, which may necessitate digging up the road. One company, with existing prices, estimates that by welding its broken frames or covers it is able to save between \$20 and \$25 at an expenditure of \$5, while at the same time lessening the amount of work done by the underground department."

INSTRUMENT MEN AND CHIEFS OF PARTIES WANTED.

The Construction Division of the Army is without doubt the most colossal organization of its kind in the history of the world. The approximate value of construction projects so far undertaken by this branch of the Government is one billion dollars. The figures representing the material used and the men employed are staggering. 250,000 workmen have been under the control of the Division at one time.

Among the Division's present urgent needs are 50 chiefs of survey party at \$2,700 to \$3,000 a year; 50 transitmen at \$2,400 a year; 25 levelmen at \$2,100 a year; 125 rodmen at \$1,800 a year; 150 chainmen at \$1,800 a year, and 50 topographic draftsmen at \$2,100 a year. These positions are open to men only, except the drafting positions, which are open to both men and women. All of the positions are in the civil, not the military service.

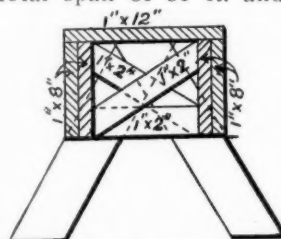
Persons interested should apply to the United States Civil Service Commission, Washington, D. C., or to the secretary of the local board of civil service examiners at Boston, New York, Philadelphia, Atlanta, Cincinnati, Chicago, St. Paul, St. Louis, New Orleans, Seattle or San Francisco.

Applicants will not be required to undergo a written examination, the examination being of the "non-assembled" type; that is, the ratios will be based upon education, training, experience and physical ability as shown by the applications and corroborative evidence. These positions offer an excellent opportunity for patriotic service, and the Civil Service Commission urges qualified persons to apply without delay.

FINISHING BRIDGE FOR CONCRETE PAVING.

A finishing bridge made exclusively of one-inch boards has been used on the construction of the William Penn concrete road in Pennsylvania by the contractors, McInerny & McNeal. This is described by Mr. McNeal as follows:

The paving upon which the bridge was used has a total span of 31 ft. and the bridge used on the work was about 32 ft. in length and made of four 1 in. by 8 in. planks with a 1 in. by 12 in. cover, the planks being bridged together on 24 in. centers. The bottom part of the bridge was open. The ends of the bridge were supported on an A brace which was made of sufficient height to allow the bridge to clear the crown of the concrete by about 3 in. This bridge will hold two men without deflection and has answered the purpose. The cost of the entire bridge was about \$20.



SECTION OF BRIDGE.

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SPECIAL SEWAGE TREATMENT METHODS.

In the October 19th issue, in commenting upon the report on the New Haven tests of the Miles acid treatment of sewage, we suggested that special conditions which would favor the adoption of certain processes not in common use may sometimes be overlooked and standard methods of treatment adopted where some other would be more advantageous. It seems to us that this idea is of sufficient importance to warrant a few additional suggestions.

The number of methods that have been proposed for treating sewage would probably run into the scores. Some of these are apparently more or less ridiculous ideas of those who have no practical knowledge of the subject; but on the other hand many appear to possess certain features of merit. In perhaps the majority of cases such processes are subjected to a few tests, the results of which largely determine their future consideration by the engineering profession. If, under the conditions under which they were tested, they gave results that were unsatisfactory, it is probable that they are entirely dropped from future consideration. If one shows up well in the tests it is, on the other hand, adopted enthusiastically by some as being the long-looked-for process that would give satisfactory results under all conditions. Later it is learned that this method does not always give satisfactory results, and it gradually finds its place as one of the two or three recognized standard methods to be used where conditions most favor them.

Where condemnation of a process is based upon excessive cost, it may well happen that under certain conditions this cost may be offset by savings, or by other advantages. For instance, if by additional cost a plant can be obtained that can be located anywhere within a city without offence, it may remove the necessity for constructing a long and expensive outfall, for pumping, etc. Or it may be that no location seems available except one where a nuisance would be greatly detrimental to surrounding property, in which case the expenditure of a considerable additional sum for a plant which, causing no nuisance whatever, would avoid depreciation of property values, would be a real

economy as compared with the construction of a cheaper plant that would be a nuisance.

Again, the rejection of a given process may have been due to failure to produce a certain degree of purification with the sewage used in the test. Conditions may occur elsewhere, however, which would make unnecessary the degree of purification set up as a standard in the original test; or a difference in the character of sewage to be treated may cause the method of treatment to give better results than in the case of the test.

There are even climatic and other local conditions which may make the difference between success and failure with a given process. For instance, a process that produces a sludge which is difficult to dry along the Atlantic seaboard may prove much more satisfactory in the arid regions, where sludge dries much more rapidly. Or a method involving a plant which does not require the use of sand or stone, although it may be expensive in one section of the country compared to some other process, may prove to be the cheapest in a section where such materials cannot be obtained except at great expense for transportation.

In this connection another point may be suggested concerning which there may be a difference of opinion, namely, the relative weight which should be given to first cost and operating costs. The last twenty-five years has seen many developments in sewage treatment, and there is every reason to suppose that the next twenty-five years will see even greater improvements along this line. The recent methods are approximating more and more to mechanical or manufacturing processes involving the employment of machinery and power, and the same rule would therefore seem to apply to them that applies to machinery generally, viz. that economy frequently requires the scrapping of a plant when it can be replaced by later and more efficient types. While almost any sewage treatment plant should have an indefinite life so far as actual wearing out is concerned, it would seem proper to limit the life to ten years, or possibly even less in some cases, because of this increasing importance of obsolescence. This view, if accepted, would render it inadvisable to invest too large a sum in a plant which it may be found economical or otherwise desirable to discard in a few years, even though the operating costs of such a plant be much less than those required by other cheaper ones.

In brief, the writer believes that there is too great a tendency to accept some two or three methods of sewage treatment as standard and thereafter to fail to consider any others, although special conditions in individual cases may be such that other less well known processes would in such cases be more economical, more effective or otherwise preferable.

THIN CONCRETE ROADS.

Some concrete roads four inches thick at the edges and six inches at the middle have broken down under truck traffic and others have stood up. Concrete Highway Magazine, the organ of the Portland Cement Association, recommends that the thickness at the edges be increased to eight inches, assuming that ordinary truck traffic furnishes about the breaking load for reasonably good concrete four inches thick, and that doubling the thickness and thus affording a factor of safety of four is in line with good engineering practice. This conclusion would seem to be a wise one and the recommendation one that should be generally adopted. A pavement that goes to pieces in one or two years may be considered a temporary one, and concrete is too expensive a material to use for temporary construction.

IMPROVING FORT WORTH'S WATER SUPPLY.

In describing in last week's issue the new water purification plant under construction in Fort Worth we neglected, through an oversight, to state that the plant was designed by John H. Gregory, who continues as consulting engineer on the construction. One or two unique features in the design that were introduced by Mr. Gregory we hope to describe in a later issue.

MAIN SEWAGE TREATMENT PLANT OF ROCHESTER.*

Description and Operating Data of Detritus Tanks, Riensch-Wurl Screens, Imhoff Tanks, Sludge Beds and Power Plant.

By E. A. FISHER† and N. A. BROWN‡

The main sewage disposal plant of the City of Rochester, N. Y., located at Irondequoit, consists of coarse racks, detritus tanks, Riensch-Wurl screens, Imhoff tanks, sludge drying beds and power plant.

Where the intercepting sewer enters the detritus tanks, coarse racks are placed. These are $\frac{3}{8}$ " bars placed $3\frac{3}{8}$ " on centers and are designed for protection of the Riensch-Wurl screens, rather than for any screening action in themselves.

The detritus tanks, of which there are six, are arranged in parallel and controlled by sluice gates. Each tank is 90 feet long and 10 feet wide, with a drop of 3 feet below the grade of the inlet sewer. The tanks have sub-drains controlled by stop gates to permit the draining of the detritus before it is removed by a traveling excavator. These sub-drains extend to a sump where a pump raises the sewage to the inlet sewer. Tracks for an industrial railway are located between the tanks for the removal of detritus. One tank is used under normal dry-weather flow and more turned on in case of storms. The six provide not only for a storm flow while one or more are being cleaned, but also provide for future increase in the flow.

Passing from the detritus tanks, the sewage enters the screen house. In four of the six channels, Riensch-Wurl screens are located. These are 12 feet in diameter, with the screen plate inclined 30° from the horizontal. They are of the bascule type, suspended from steel bridges, have no submerged bearings and may readily be raised above the flow line. Two have $1/16$ -inch by 2-inch openings, one $\frac{3}{8}$ -inch by 2-inch, and one $\frac{1}{8}$ -inch by 2 inches. The first are used in times of storm and the effluent bypassed directly to the outlet. Two $\frac{3}{8}$ inch were originally installed to screen the sewage preceding the Imhoff tank treatment. This opening was too large to prevent much floating material passing into the tanks. One was replaced by the $\frac{1}{8}$ -inch plate, which is giving better results.

The screenings are brushed onto a belt conveyor that carries them to a hopper, from which cars carry them to the screening dumps. Passing the screens, the sewage is collected into either of two channels, where, by gate control, it flows to the Imhoff tanks, or can be passed directly to the outlet pipe. The channel has automatic regulators to divide the flow, so that each of the ten Imhoff tanks receives one-tenth of the flow.

The Imhoff tanks consist of a battery of ten tanks built in units of two tanks with inlet channel constructed to permit the addition of another ten tanks when the future flow demands it. The tanks are of

rectangular plan 116 feet by 35 feet and a depth of 40 feet. Each tank as two flowing-through channels 10 ft wide and 10 ft 6 in. from water surface to the digestion chamber slot. There are three gas slots the length of the tank, two being 2 ft 6 in. and one 3 ft 6 in. in width. This gives a larger gas area than is the usual design. The digestion chamber is of the same dimensions as the tank proper, and is divided into three hoppers. There is a clear sludge-storage capacity between the slots and top of these hoppers of 15 feet.

The tanks are reversible through a system of quick-acting sluice gates. Eight-inch pipes from each hopper extend to a sludge channel built in the wall common to two tanks. This channel extends the length of the tank and the sludge passes into a 20-inch pipe to the open channel on the sludge beds.

Each tank is served by four sludge beds 44 ft by 44 ft. These beds have 19 inches of broken stone and sand, and are underdrained with 3-inch tile on 8-foot centers. Concrete walls form a depressed track for use of trains in removing the sludge and these same walls carry a gantry crane which places the car bodies on the beds for the sludge to be loaded.

From the Imhoff tanks, the effluent enters a divided channel, one part carrying the dry weather flow, while a central weir wall takes care of the storm flow.

The storm flow enters the 5 ft. 6 in. steel outfall pipe, while the dry weather flow goes to the 4 ft. 0 in. penstock of the hydro-electric power plant now under construction.

This power plant will be equipped with two 75 k.w. hydro-electric generating units, and will furnish power for the sludge crane, detritus excavator, screens, lighting and the electric locomotives used in handling the grit and sludge.

The tail race of the power plant enters the 5 ft. 6 in. outfall pipe. This pipe extends into Lake Ontario 7,000 feet, terminating in a timber crib in water 50 feet deep.

SCREENING.

The original installation of screens consisted of four Riensch-Wurl screens 12 feet in diameter, at an inclination of 30° with the horizontal. Two had openings $\frac{3}{8}$ in. by 2 in., so cut as to give 43 per cent opening. These were installed to operate on the dry weather flow preceding the Imhoff tanks. Two had openings $1/16$ in. by 2 in. with 18.8 per cent of opening. These were so located as to permit the effluent to be turned into the Imhoff tanks, or by-passed to the plant effluent.

The removal on $\frac{3}{8}$ in. by 2 in. openings was found to be so low that one of these has been replaced by plates having $\frac{1}{8}$ in. by 2 in. openings, giving 32.6 per cent openings, which gives a more satisfactory removal of the floating material, such as matches, peas, kernels of corn, etc., which passed through the $\frac{3}{8}$ in openings and had to be removed by skimming from the Imhoff tanks.

From January 1 to September 1, 1918, the amount of screenings removed was 1,856 cu. yds. from a sewage flow of 7,786,300,000 gallons, or a removal of 6.44 cu. ft. per million gallons.

The amount of screenings is variable, depending on size of openings, velocity through screen plate (caused by the quantity being passed through one screen), and the density of the sewage. The variable amount is shown by the following table:

Time Elapsed	Mesh	Rainfall	Cu. ft. screenings per m.g.
6 days	$\frac{3}{8}$ "	.92"	2.00
3 "	$\frac{3}{8}$ "	None	1.02
6 "	$\frac{3}{8}$ "	None	3.03
5 "	$\frac{3}{8}$ "	.18"	2.62
6 "	$1/16$ "	None	3.80
3 "	$1/16$ "	1.06"	6.47

*Paper before the American Society for Municipal Improvement.

†Acting City Engineer of Rochester, N. Y.

‡Special Assistant on Sewage Disposal.

The amount of loss of head is affected by the suspended matter in sewage. In time of rain a heavy mat on the screen increases the loss of head.

Based upon the observations of a number of days, the following curve was determined for flows up to 35 m.g.d., on the 1/16 in. mesh screen.

Y = loss of head in feet; X = rate of flow in m.g.d.

$$Y = .01(2.9x + 71).$$

For the 1/8 in. screen, with X varying from 24 to 40 m.g.d., the equation is $Y = .025(x + 1)$.

GRIT CHAMBERS

The amount of grit removed from a flow of 7,786 million gallons was 509.2 cu. yds., or 1.76 cu. ft. per million gallons. This quantity varies from .95 cu. ft. per million gallons in January to 405 cu. ft. per million gallons in March. This is exclusive of the two grit chambers at the river siphons.

SLUDGE.

On May 8 the quantity of sludge in the tanks was 13,400 cu. yards. Between May 8 and September 2 there was drawn 9,890 cu. yds. of wet sludge. There then remained in the tanks 7,680 cu. yds. There was therefore deposited in the tanks, from May 8 to September 2, 4,170 cu. yds. The flow through the tanks in this time was 2,051.7 million gallons. Sludge accumulated at the rate of 2.03 cu. yds. per million gallons. The temperature affects the volume of sludge in the tanks, so these figures are indefinite.

Sludge is drawn onto the beds to a depth of 9 inches. Under the most favorable weather conditions it becomes spadable in six days. Throughout the season the average drying period would be 11 days.

The moisture content of the sludge when drawn averages 81 to 83 per cent, and when removed from the beds has been reduced to 57 to 63 per cent.

The total sludge drawn this season up to September 1 was 11,385 cu. yds. of wet sludge. In drying, this volume shrinks about one-third or nine inches of wet sludge reduces to six inches in thickness.

OPERATING SEWAGE PLANTS.

Abstract of Instructions Issued by Texas State Board of Health—Tanks, Sludge Beds, Filters, Activated Sludge—Operation Records.

The Bureau of Sanitary Engineering of the Texas State Board of Health has recently issued a pamphlet entitled "Instructions for the Operation of Sewage Plants." These instructions begin with those for maintaining sewer mains, since "if the sewage itself has become foul and septic before reaching the disposal works, then a nuisance is liable to result, even with the most careful operations of the works." There is recommended regular inspection of all sewers; flushing as needed; inspection of inverted syphons weekly; dragging at once in sections where obstructions are found that cannot be removed by flushing, and dragging at least twice a year all sections where roots are found, to prevent large accumulations of them; cleaning all sewers at least once a year; keeping manhole heads up to street grades; repairing promptly any leaks or defects in the sewer.

Septic tanks.—Great depth of scum should not be allowed to form on the surface of the liquid, but should be broken frequently to liberate the entrained gases, for which purpose a stream of water under good pressure can be used to advantage. Sludge should be removed from the bottom of the septic tank at least once every

three or four months and should be spread on drying beds. Dried sludge can be either burned or carted away. In grit and screen chambers do not allow accumulations to remain, but remove the grit at intervals and dispose of it outside the tanks, and flush from the bottom of the screen chamber such heavy organic matter as may settle there. Clean the screens daily and bury or burn the screenings at once.

Imhoff tanks.—Keep the channels clean at all times, flushing out deposits daily in winter and twice a day in summer. Skim off oil, grease and all floating matters in the settling compartments at least once a day, disposing of this matter outside of the tanks. For skimming off floating matter, a dish-shaped perforated skimmer 18 or 20 inches in diameter and attached to a long wooden handle may be used. Clean the sides and bottom of settling compartments daily in winter and twice a day in summer; for which purpose there may be used a rubber squeegee consisting of a flat hardwood board from 12 to 24 inches long and 3 or 4 inches wide with rubber edges and a light wooden handle. Clean the slots once a day. In cleaning down the sides of a settling chamber, the cleaner should be moved slowly and the deposits removed from the sides should be forced through the slot into the sludge chamber. This is especially necessary at the outlet end of the tank so that the matters scraped from the walls will not be stirred up and carried away into the outlet channel. If deposits adhere to the sides and decompose, odors are sure to result. Most of the matter floating in the settling compartments can be made to settle by sprinkling with water; but oil and grease must be skimmed off and removed from the tank.

The direction of flow should be reversed every two weeks. Before reversing the flow, the channels should be cleaned thoroughly, especially at the end which was formerly the inlet and will become the outlet; otherwise on reversal of the flow matter deposited there will be washed into the outlet channels. Also remove all floating matter between the scum board and the end of the tank, and clean thoroughly all parts of the tank between the scum board and the end, permitting the deposits that have been stirred up by this cleaning to settle before reversing the flow.

In operating the sludge chamber, stir up the sludge once a week with water under pressure applied through a submerged perforated lead pipe. This will sometimes check excessive scum formation by driving off the gas in the sludge, and may stimulate the activity of the digesting organisms by washing out the enzymes. Sludge should not be allowed to reach a point higher than eighteen inches below the slot before withdrawing, and in general sludge should be removed about every two months. It is better to remove small amounts of sludge at frequent intervals than to withdraw large quantities infrequently.

About two hours before and after withdrawing the sludge, measure and record the depth of sludge; and about an hour before, open the valve for a few minutes so as to loosen up the sludge about the sludge riser pipe. If for any cause the sludge pipe should become clogged, it may be cleaned by pushing a rod through it or by forcing water or clarified sewage through it under sufficient pressure. If partly digested sludge appears, the valve leading to the bed must be closed at once; such sludge being recognized by its grayish color and foul odor, while digested sludge is brownish-black with only a faint tarry or rubbery odor. After withdrawing sludge, the sludge pipe must be flushed, which can be done by opening the valves or by back-flushing from water connections; the water used in such flushing being dis-

charged upon a section of drying bed upon which there is no sludge.

Scum in gas vents should be broken up daily. If it cannot be broken up by sprinkling with water, then break it with a pole, spade, or otherwise. Large quantities of scum must not be allowed to collect in the gas vents, but that which will not settle should be removed and burned.

Sludge beds.—Do not put freshly withdrawn sludge on top of sludge already on the beds, for it will not dry quickly. Do not remove partly dried sludge from the beds. It is better not to withdraw during wet or freezing weather, as such weather interferes with the drying. The sludge may be used as fertilizer, lightening heavy soils and furnishing humus to those which lack it; or it may be used for filling in low places, since thoroughly digested sludge does not undergo putrefaction or produce odors.

Dosing chamber.—If any floating matter passes into the dosing chamber it must be skimmed off, for it would clog the nozzles of filters. For the same reason, clean down the sides of the tank to prevent accumulations adhering thereto and keep the bottom of the tank clean. See that all pipe connections to the syphon are perfectly air tight.

Sand filters.—Except in emergency, no sand filter should be used continuously more than one day, so that the beds may rest between doses. Before dosing a bed it should be raked lightly to a depth of one-half inch with fine, sharp rakes. When the surface becomes so clogged that the sewage does not percolate, allow the bed to rest until the surface is dry and then rake the sand to a depth of a half-inch or slightly more. When this does not restore porosity, rest the filter, dry and scrape off and remove the sand to a depth of one-half inch, loosen the surface lightly with rakes and rest the bed one day longer before putting it into service.

Contact beds.—The surface of the stone should be kept three or four inches above the water level in the beds to prevent the fly nuisance. After a service of five years, more or less, the contact material will have to be removed, cleaned and replaced.

Sprinkling or trickling filters.—The nozzles should be examined every day and kept perfectly clean. Side-walls should be carefully washed down and kept free of dirt, flies and gnats. Main drains should be flushed out at least once a week with water under pressure. Any dirt or dust, leaves, paper, etc., that may collect on top of the filter should be removed at once. If a mat forms on top so thick as to prevent percolation at any point, it should be raked off and the bed carefully washed with water.

Discharge channel.—The channel should be kept clean and this and the stream receiving the effluent should be kept free from pools in which the effluent will stand; or if this is impossible, all pools should be oiled once a week during the season when mosquitoes breed. Any weeds growing along the channel should be cut to give the sun and air access to the effluent.

Activated sludge method.—The purification of sewage by aeration in the presence of activated sludge is still in its infancy, and the varied character of plans being built forbids the giving of full instructions covering all of the details of operation. Each plant will have to be governed by special instructions of the engineer in charge, but a few general directions may be given as follows:

"All dust and oil should be excluded from the air introduced.

"The presence of grit seriously affects the process, hence attention should be given to the grit chambers to see that they are functioning properly.

"All sewage should be screened before entering aeration chambers in order to remove all indestructible matter such as rags, orange peelings, matches, corks, rubber goods, etc.

"A close observation must be kept on the operation of the diffusers (filtros plates, wooden diffusers, or perforated pipes) in order that the maximum efficiency may be derived. Air should be delivered in large quantities of very small bubbles distributed through the entire cross section of the tank, rather than large bubbles in portions of the tank. Broken diffusers, or diffusers which have become worn or clogged, will not operate properly.

"Provision must be made for the de-watering of the sludge. This may be done by providing large sand areas upon which it may be dried or by providing suitable presses for the purpose. In drying the sludge upon sand beds a larger area is required than for Imhoff tank sludge and it should be placed upon the beds in thin layers as it dries very slowly.

"Investigations of different methods of drying the sludge from the activated sludge method of sewage treatment have been under way for some time by Dr. Eugene P. Schoch, Austin, Texas. The results up to the present date are very promising and are being followed with great interest by the engineering profession generally. One method which seems to be especially favorable to Texas conditions is the mixing of lignite dust with the sludge as it is withdrawn from the tanks, subsequently placing this mixture upon the sand beds to dry. This mixture dries much more rapidly than the unadulterated sludge and after drying may be used as a fuel, thus disposing of the sludge as well as utilizing the dust. For more detailed information as to the results of his experiments, those who are directly interested in the future developments along this line are referred to Dr. Schoch directly."

Records of operation.—The sewer maintenance force should report daily to the superintendent, who should keep a record of all troubles, obstructions, etc. The superintendent in charge of the plant should measure from time to time and record the amount of sewage entering the plant, should record the date of cleaning grit and screen chambers, the amount removed and how disposed of; he should measure and record once a week the depth of sludge in the sludge chamber, also the distance from top of scum to top of walls, with the appearance and odor of the scum; also he should measure the depth of sludge as soon as it has run onto the drying beds and again just before removal from the beds. Samples of raw sewage and of effluent should be tested daily at two p.m. for the amount of settling solids, for putrescibility and for bacteria.

The attendant should keep a diary at the plant to record any unusual features that do not appear on the operating sheets. This should show the date of receipt or of ordering new supplies, of changes at the plant, should note the employment of any number of extra workmen and for what purpose. Diary and operating records combined should give a complete history of the plant from day to day. Attendants should not be afraid to put down what may seem unfavorable to them, as a record of these is necessary for improvement in operating condition, as the flow of sewage and other factors change from time to time.

Open flame should not be permitted in wells or pumping stations or around gasoline engines. The grounds should be parked and kept clean and tanks should be kept screened. Tools should be kept in a tool-house. There should be a small incinerator for burning screenings.

The WEEK'S NEWS

State Department to Build Highway in Tennessee—Street Maintenance as a War Conservation Measure in Denver—Influenza Continues, Decrease in Army Camps—New York Health System Reorganized, Borough Control—Chlorination in Sacramento Prevents Typhoid—Newark Fails to Prevent Sale of Lake—Thirty Per Cent Gas Rate Increase in Providence—Airplane Helped Fight Gillespie Plant Fire at Morgan, N. J.—Seven-Cent Fares in New Jersey—Louisville Appoints Women Street Cleaners.

ROADS AND PAVEMENTS

State Department to Build Highway Itself.

Chattanooga, Tenn.—The completion of the Dixie Highway between Nashville and Chattanooga is to be undertaken at once by the state highway department, employing its own labor and under the direction of A. M. Nelson, state highway engineer, according to the decision of the commission. The bids for construction of twelve miles of the highway in Bedford and Moore counties, between Shelbyville and Tullahoma, amounting to \$180,000, and for the completion of ten miles of the highway between Cowan and the Marion country line on top of Cumberland mountain, beyond Sewanee, amounting to approximately \$124,000, were rejected by reason of the fact that they are greatly in excess of Mr. Nelson's estimates and because the contractors refused to guarantee the completion of the work under fifteen months. This is the second set of bids which have been received and rejected. State highway engineer Nelson was authorized to borrow, rent or buy the equipment necessary to carry on the work on these projects, employ the labor and superintendents, and proceed with the work as rapidly as possible. This work will be carried on out of federal, state and county funds in the same way as if the work had been let on contract. Just how soon it can be started, Mr. Nelson was unable to state. He said, however, that all possible speed would be used in getting the preliminaries out of the way, such as securing the formal approval of the United States Highways Council necessary on all construction work of this character; the organization of the forces, establishment of a maximum price for labor, teams, material and road working machinery with the government authorities. Judge Arthur Crowover, chairman of the highway department, and Judge M. M. Allison, president of the Dixie Highway Association, have gone to Washington to make the arrangements with the government authorities. Chairman Crowover stated that in addition to carrying on the work on the projects in Bedford, Moore and Franklin counties, one of the first things the department would do is to start work opening up the road from Monteagle, a distance of two miles to the brow of the mountain, and connecting up the new grade along the Battle Creek road, which is now within 1,000 feet of the top of the mountain. When this is done, even before the surfacing is put on this road, it will be possible to use the Dixie Highway under favorable weather conditions in crossing Cumberland mountain, eliminating fifteen miles of bad road.

Denver's 1919 Street Maintenance Needs.

Denver, Col.—As a war conservation measure the city administration is to emphasize street maintenance instead of new street and alley improvement in its 1919 program. An estimate of materials needed for maintenance of streets and alleys next year, prepared by manager of improvements and parks J. A. Burnett, and accompanied by a letter from mayor W. F. R. Mills, has been sent to the United States Highway Council at Washington, in accordance with Government instructions to municipal authorities. Denver's estimate makes a reduction of 25 per cent in cost of materials, as compared to 1918. Mayor Mills' letter says in part:

It is our policy not to do any new construction work (except a small improvement district which had already been

started and has been submitted to you for your approval), but to devote all our efforts to the maintaining of the proper condition of our present streets.

You will notice that we have asked for 150,000 gallons of 50 per cent asphalt oil. We find that the liberal use of trucks during the past season, and the contemplated use during the season of 1919 has caused us to maintain a harder base for our streets, as slag and gravel do not seem to be sufficient to carry the heavy trucks without serious damage.

As you are aware, we live in an altitude of 5,280 feet, with an average precipitation of 13.7 inches. During the past season we have had 19,000 local automobiles in constant use, in addition to trucks and tourist travel, and we find that the oil is a great saving in sprinkling, as it is a dust preventative and conserves labor.

We are extremely fortunate in having our slag and gravel so close at hand; we have our own municipal asphalt plant and gravel pits; the slag comes from a local smelter. We have been very conservative in our estimates and expect to use our entire energy in releasing labor and using only such material as is absolutely necessary for the upkeep of our streets during the period of the war.

The statement shows that asphalt, road oil, fuel oil and lumber are the only material which must be brought from a distance, with the exception of 1,000 square yards of creosote wood blocks to be used in repairing the Twentieth street viaduct. A summary of Denver's highway mileage is included, as follows:

Number of miles of streets to be maintained.....	989
Concrete gutter and curb, miles.....	500
Concrete paved streets, miles.....	50
Dirt alleys, miles.....	609

Street mileage includes 226 miles surfaced oil, slag, crushed rock and gravel; 48 miles of asphalt and 795 miles of dirt surface.

"Suburban Road Systems" in Ontario.

Toronto, Ont.—It is stated by the Ontario Department of Highways the growth of motor-truck traffic will undoubtedly call for stronger foundations for roadways, particularly on interurban highways, and over certain qualities of subsoil the use of concrete in place of ordinary broken stone will be necessary. According to the department's report for 1917 there were 83,790 motor vehicles (78,861 passenger and 4,929 commercial) registered in Ontario last year, or nearly twice the registration of 1915. There is now in Ontario one car for each 39 of population; the average in the United States is one for each 20 of population. It is true in Canada as it is also true in the United States that agricultural communities, rather than manufacturing, contain the greatest number of cars in proportion to population. In Saskatchewan the registration is one car to each 12 of population. In Ontario 22,409 cars are owned by farmers. Limiting loads for Ontario have previously been fixed, but in view of the trend of commercial traffic, the report states, it is desirable to consider the future in order that the maximum load may be still further reduced. Of the 4,929 motor trucks registered in Ontario last year, nearly 75 per cent were classed as 1-ton or less, over 97 per cent were 3½-ton or less, while less than 3 per cent were 4-ton and upwards. Road improvement was materially affected by war conditions during the last year, more especially by the scarcity of labor, high wages, and lack of railway service for the transportation of materials. However, the efforts of the department have been devoted to organization for road development after the war. The improvement of country roads, the department says, will bring the greatest service to the greatest number. These constitute about 20 per cent of the roads of the Province and will carry about 80 per cent of the traffic. "The substantial

improvement of such roads, or a portion of them, and their maintenance no doubt fall within the definition of justifiable war measures," it is pointed out. During 1917 returns of county road work show a total outlay of \$1,388,342, of which \$1,006,815 was for construction and \$381,527 for maintenance. The total mileage of surfaced roads was 149.46; miles of road graded only, 104.70; 75 bridges were constructed. The county road system has been adopted by all but one county. A year or two ago "suburban road systems" were authorized by the Government, as it was realized that increased carrying capacity and utility of main roads would greatly increase the direct value to cities of country roads. Suburban road commissions to supervise and carry on this work have been organized in Toronto, Kingston, Guelph, Galt, Kitchener, Hamilton, Brantford, St. Catharines, London, Windsor, and the town of Smiths Falls.

SEWERAGE AND SANITATION

Influenza Continues—Hope of Abatement.

Washington, D. C.—Reports from all over the country to the United States Public Health Service continue to show that the disease is spreading and increasing its hold on those communities it has reached. The only hope of the end being in sight is afforded by improved conditions in the army camps and in the Boston metropolitan area. Official reports for Oct. 21 showed improvement in the situation in six states, but twenty-seven other states reported the disease still spreading with many additional cities and rural districts affected. Conditions apparently were worse in Pennsylvania. In army camps a slight increase in both influenza and pneumonia were reported the day before the report, but a decrease was shown the next day with 3,007 influenza cases and 768 pneumonia cases, the lowest figures reported since the epidemic became general in the camps. For the forty-eight hours ending at noon new influenza cases totaled 6,666, pneumonia 2,079, and deaths 919. These figures brought the total of influenza cases since Sept. 13 to 290,470, pneumonia cases to 6,055, and deaths from all cases to 15,012. To provide additional funds for fighting the epidemic Senator Lewis has introduced a bill to appropriate \$10,000,000 more to be expended through state and city health departments. Reports of rapidly spreading sickness come from the Pacific Coast states. In war-crowded District of Columbia the epidemic continues unabated. As a further precautionary measure, the Treasury and Interior Departments issued orders that no new employees of those departments be brought to Washington until further notice. Similar action is expected by other Government departments which still are in need of additional workers. The Fuel Administration met the suggestion of the Public Health Service also announced that as far as possible all engagements and appointments for conferences with out-of-town persons during the next few weeks will be canceled. In Baltimore a shortage of coffins and grave diggers forced action by Mayor Preston, who sent city laborers to work in the cemeteries. In Wilmington, N. C., the relief workers have announced all danger as past and have gone to other parts of the state at the request of Governor Bickett. The work of the committee included everything from nursing and medical care to the preparation and distribution of mustard plasters and soup to patients and payment of insurance premiums.

New York, N. Y.—Within the past week official reports seem to indicate that the disease is either stationary or decreasing slowly. The city's death rate, is, however, at least three times the normal rate. While new influenza cases are being reported at the rate of three to four thousand a day, even health commissioner Copeland has admitted that reports are incomplete, and that only about half the actual number of cases is being reported by physicians. Members of the medical profession hold that there are still a large number of unreported cases, and that the only way to approximate actual conditions is by a study of death statistics which are accurate. The system employed by Dr. E. H. L. Corwin, executive secretary of the

Public Health Committee of the Academy of Medicine, is based on the fact that at army camps reports show that 3 per cent of those afflicted die. Dr. Corwin took the statistics in this city for the week of Oct. 12, when there were 2,121 deaths, and the week of Oct. 19, with 4,217, and by multiplying the total by thirty-three he got approximately 209,000 new cases on Oct. 19. The Public Health Committee of the Academy of Medicine called upon Governor Whitman to appoint a commission to study the epidemic in the hope of discovering means by which future epidemics might be averted or controlled. The committee also recommended that no surgical operations be performed at this time unless urgent. A call was also issued to the public and to physicians by the academy requesting that as few nurses as possible be employed, especially in one case, and to dismiss them as soon as a family is able to take care of its own sick. The academy also recommends that nurses be engaged on a part time system instead of for their full time. If this is followed nurses will be able to look after other patients in their off times. The situation in Staten Island has especial danger owing to the local shipbuilding plants. The U. S. Shipping Board has asked special attention by the city officials because the efficiency of these shipyards has been reduced by 40 per cent. The health department has issued orders that landlords throughout the city furnish steam in heated apartments, the entire sanitary police force of the department being sent out to check up complaints and to force legal action for failure to comply. Use of a vaccine for influenza and pneumonia on 450 Y. M. C. A. workers shows excellent results. Health commissioner Copeland does not feel it necessary to close schools or theaters.

Philadelphia, Pa.—While conditions continue severe, indications point to a decline in the progress of the influenza epidemic here. New cases have dropped to 14,566 last week from 20,854 the previous week. The city health bureau has begun the distribution of influenza vaccine prepared in the department's laboratories. This vaccine is administered in three injections, 48 hours apart. A number of city officials, including Mayor Smith, are ill with the disease. Conditions in other cities in the state are not as encouraging. The coal mining sections, particularly Scranton, are particularly hard hit, and thousands of tons of anthracite are being lost to production because of the spread of the disease among the miners. Special requests have been sent out by national authorities asking for aid. New York city has sent doctors and nurses. Camden, N. J., has been suffering severely. Burial conditions are such that relatives are obliged to dig graves for their dead. Policemen and firemen there have been set to work to make coffins. The Fourth Naval District reports almost normal conditions after a month of the epidemic. In Gloucester, N. J., the epidemic appears to be declining. At Camp Dix, Wrightstown, N. J., conditions are back to normal and the quarantine, which has been in force more than a month, has been lifted.

Boston, Mass.—The influenza epidemic appears to be on the wane in the eastern part of the state, the city officials here feeling much more optimistic. Theaters, schools, saloons, etc., have been reopened. The First Naval District also reports a low mark in the number of new cases. The mill cities of New Bedford, Fall River, Worcester, Lawrence and Haverhill report an increase of the disease. At the U. S. Shipping Board's Atlantic training base, the board took vigorous measures to prevent the spreading of the disease among the four thousand apprentices. The board's system's special effectiveness appears due to the manner in which the patients are isolated and treated in cubicles ventilated in a particular way. The idea was developed at a tent hospital established by Dr. William A. Brooks, Medical Director of the Shipping Board's training service, on a high hill in Brookline to take care of the first cases appearing at the Boston training station. The tents have been replaced by specially built shacks in which ventilation can be controlled and a maximum of sunshine secured. In each shack one-half the roof can be tilted back, opening the whole room to the sun and air. One side of the room is a glass sash that can be opened out completely. The

walls of the room do not reach to the roof, leaving about a foot clearance for air space. In each room there are two beds, with a sterilized sheet hung between, to prevent the passage of germs. The cubicle is connected by a door in its back wall with a heated corridor, which connects with an administration building.

Toronto, Canada.—Cases of Spanish influenza are now being reported from many eastern Canadian cities, but the percentage of deaths remains low, and it was said by medical authorities here that the epidemic is not likely to assume such proportions as in the United States. The situation in several military camps in Ontario and Quebec, however, is causing some concern. In St. Johns, Quebec, 580 cases and nine deaths have been reported in the engineers' barracks, while 80 cases have been reported among soldiers quartered in Montreal. Most of the Ontario cases have been discovered in Royal Air Force camps here and at Hamilton. The Royal Air Force has stopped all leave to the United States. With several hundred cases of influenza in Sherbrooke, P. Q., and six deaths reported, the Protestant schools were closed.

Health System Reorganized—Borough Control.

New York, N. Y.—Health department changes that are revolutionary in system, though not in personnel, have been announced by health commissioner Copeland. The changes, he explained, have for their purpose co-ordination of the work of the department and the granting of autonomy to the boroughs. Borough self-government has long been a subject of agitation, especially in Brooklyn, where it was much discussed during the infantile paralysis epidemic. The chief officer in each borough will, as now planned, become the head for that borough. Under the civil service rules these officers are called assistant sanitary superintendents. In explaining his changes, Dr. Copeland said that a new arrangement of authority appeared to be wise. More than this, he said, it was his opinion that the changes would approximate more closely than before the charter requirements, "which clearly provide for borough autonomy." The commissioner explained the working out of the new system as follows: "When any important matter, having to do with the special activity of a given bureau, arises in any borough, the director of the bureau involved, representing the commissioner, will make personal investigation, or direct it to be made by some employe of the central office of that Bureau. The result of this examination, should any special or immediate action be necessary, will be dealt with by the direct order of the commissioner, through the sanitary superintendent. When the bureau director or his representative, goes to the borough on a visit of inspection or investigation, he should be considered the representative of the commissioner and receive the same assistance, on request, that would be rendered the commissioner were he to make the visit in person. But, except in cases of emergency, where the health of the community is involved, no orders to the chief officers of the borough will be issued except through the regular channels. There will be attached to each borough office, as is the practice at present, a representative of each of the bureaus of the department requiring field representatives. As regards discipline, all the employes in a given borough will be under the direction, supervision and control of the assistant sanitary superintendent. It is to be understood that, except in cases of emergency, each employe now or hereafter assigned to a borough office, for the work of a given bureau, will not be taken from that particular work without orders from the commissioner's office. It is considered inadvisable to upset the specialized activities of the bureaus, as constituted under the present organization of the department. The purpose of this order is not to confer power on the assistant sanitary superintendent to give new and unusual duties to the employes now on the payroll of the various bureaus, but it is intended to make clear the question of disciplinary authority." Questions of policy, exceptional conditions and changes in personnel will be brought to the personal attention of the commissioner, who will make

final decision in cases of disagreement between the sanitary superintendent and the head of any borough. "There can be no doubt that in a great city like ours," Dr. Copeland said, "the borough office should hold a larger place in health department administration. Through it there can be personal contact with and actual knowledge of local conditions, impossible under the centralized bureau system, and especially impossible under the triple-headed bureau-borough-health district plan now in force. It is perfectly apparent to me that the bureau directors and borough officers are all at sea just now. All are eager for any plan that will end the clashing of authority and promote the usefulness of the department. It is believed that the system here proposed will accomplish both these desirable ends, and, with the approval of the board of health, it will take effect Oct. 1. There are duplicated divisions, unattached divisions and other anomalous administrative arrangements that will be given attention and provided for on the completion of this plan of organization. Details will be worked out in order that the plan may be given full effect at the stated time."

Judges' Aid Asked in Venereal Disease Fight.

Washington, D. C.—A letter has been sent out by the Attorney-General of the United States to United States district judges describing the federal departments' plans with regard to eradication of venereal diseases, and the social evil about army camps and stations. The letter points out that it is the opinion of both the war department and the department of justice "that there is no provision in the war statutes more important, in its relation to the efficiency of the military and naval forces," than the section regulating prostitution "in and about army and navy camps and stations." How federal authorities should deal with these problems, emphasizing the preventive phases of the battle against venereal disease, is set out in the letter, which points out that the surgeon-general of the United States Army is "engaged in an aggressive and systematic campaign against venereal disease." Instructions on the subject have been issued to state and local health boards by the surgeon-general and the attorney-general sets out that the department of justice should do all in its power to assist in the campaign. He then states that he has instructed United States attorneys to pursue the following course:

"You are, therefore, instructed in the cases of all persons arrested under the foregoing section and regulations, to arrange for the immediate reporting of all such persons to the local or state health authorities, in order that these authorities may have opportunity, under local health laws, to cause medical examination of such persons to be made, and to enforce such health laws, regulations or ordinances relative to quarantine, treatment and other disease control measures. Pending the examination, isolation and treatment by the health authorities, the prosecution should be suspended, to be resumed when the health authorities discharge the defendant from the hospital or other institution to which she may have been sent by them.

"If the local health laws, regulations or ordinances are inadequate, or if the local health authorities fail or refuse to act promptly when a case is presented to them, then you should bring the case to trial at the earliest possible date, and if it results in conviction or a plea of guilty, ask the court for a brief delay or sentence, and, between the date of conviction and the date of sentence, arrange for a medical examination of the defendant. If such medical examination discloses the existence of an infectious venereal disease, you will present a written report of such fact to the court, to be considered by the court, in connection with all of the facts of the case, in determining the sentence to be imposed.

"In all cases where medical examination, either under local laws or as above provided for, reveals the existence of venereal disease, you are directed to urge the commitment of the persons so diseased, wherever possible, to reformatory or penal institutions equipped with facilities for proper medical treatment during the period of imprisonment. In every such case the authorities in charge of such institution should be notified in writing of the physical condition of the convicted person and directed to afford all proper treatment. Such authorities should be further requested, before the termination of the period of imprisonment, to notify the local health authorities of the then physical condition of the prisoner, in order that such quarantine or supervision may be instituted, under state or local laws, as may be necessary for the protection of the public health."

After quoting these instructions to the district attorneys, the letter to the federal judges closes as follows: "You will see that this procedure will, for success, require the co-operation of the courts so that, while any such case is

in the charge of the health authorities, prosecution may be suspended, and where the examination takes place after conviction of the defendant, the imposition of the sentence may be delayed for such time as is necessary to permit the medical examination."

WATER SUPPLY

Chlorination Prevents Typhoid.

Sacramento, Cal.—Since 1915, when the chlorination of the city water was begun, there has not been a single death from typhoid fever in Sacramento attributed to the city water, says commissioner of public health and safety G. C. Simmons. Previous to this time the deaths from typhoid amounted to as high as thirty-two in 1913, twenty-three in 1914 and eighteen in 1915. In 1916 the deaths dropped to four. Commissioner Simmons says that all deaths from typhoid in Sacramento are traced to outside sources. At the present time one and sixteenths pounds of chlorine to the million gallons of water is being used at the city water works. Simmons says this is a very small amount, and that during winter months the amount required goes as high as three pounds. In following the record that Sacramento now shows by its health reports commissioner Simmons says: "In the early part of 1912 a number of cases of typhoid fever were reported from the Oak Park district, and at that time, as a member of the board of trustees of the city of Sacramento, I recommended that the sterilization of the drinking water by means of the highly recommended chlorine process be employed. With the subsidence of the epidemic it was not deemed advisable to enforce this recommendation. The number of cases of typhoid in Sacramento in 1914 showed that the disease was on the increase, and on the recommendation of Dr. Williamson, at that time health officer, a chlorine plant for sterilization of the city water was installed and commenced operation in March, 1915. For that year—1915—there were eighteen deaths from typhoid fever and ninety-seven cases reported. In 1916 the deaths from typhoid were reduced to four and the reported cases twenty-six. In 1917 there were five deaths in the city of Sacramento from typhoid, all traced to out-of-town causes, and there were forty-six reported. In 1918, up to July 1st, three deaths from typhoid fever, all out-of-town cases, and eleven out-of-town cases reported. Since 1915 there has not been one death from typhoid fever in the city of Sacramento originating from the drinking water supplied to our city. Looking at it from a financial standpoint in the experience of Sacramento we are saving eighteen lives a year and 100 cases of sickness from typhoid, and as each case costs the individual at least \$100 the total loss would be to the individuals, aside from the deaths that occur, \$10,000. This has been prevented by the expenditure of some \$3,000 per year for chlorination."

State to Regulate Water Supply and Sewerage.

Oklahoma City, Okla.—Effective Oct. 1st, all construction of public water supply systems and sewage disposal systems is now under the supervision of the state board of health. Before contracts for such construction can be awarded it will be necessary to have the plans approved by the state board. This is in accord with the provisions of a law passed by the 1917 legislature. In order not to do an injustice to communities which had systems under construction it provided that the law would not go into effect until Oct. 1, 1918. A competent sanitary engineer provided by the state highway department and working under the supervision of the state board of health will inspect all plans for construction. Dr. John W. Duke, health commissioner, considers the measure an important and far-reaching one. The drastic powers granted the board are indicated in the following section: "Whenever the state board of health shall have reason to believe that the sanitary quality of any water supplied to the public within the state for domestic or drinking purposes is such as to be prejudicial to the public health, it may, upon its own motion investigate the character of such water supply.

And the state board of health is hereby given authority to make an order requiring such change in the source or sources of such water supply, or in the manner of storage, purification or treatment of such water supply, as may be necessary in its judgment to safeguard the public health. It shall be the duty of the person, company, corporation, institution or municipality having in charge the water supply or the works for the distribution of the supply to fully comply with the said order of the state board of health." It is further provided that in case any person, corporation or municipality shall consider such order unjust or unreasonable, they may within thirty days appeal to the district court of the county, which has the authority to set aside or modify it. The state board of health under this law is given power to order such changes and improvements as may prevent pollution of a water supply system. The powers of the board in regard to sewage disposal and the construction of sewage systems are similarly far-reaching. Failure to furnish the state board with information when requested or refusal to obey its orders is a misdemeanor punishable by a heavy fine. Each additional day such refusal is persisted in constitutes a fresh offense, for which a distinct penalty may be imposed. The state board of health is empowered to call upon the attorney general of the state, if necessary, for enforcement of the law.

New Filter Plant Built by Department.

Watertown, N. Y.—The new city filter plant built during the summer by the board of water, light and power, has been completed and been placed in operation. It is expected that the new plant will assure that for many years to come this city will be abundantly supplied with water, and that the difficulties of past summers with the plant working beyond capacity to provide a dangerously low supply will no longer be encountered. The new addition adds one-half to the 6,000,000 gallon capacity of the filter plant equipment making a total of 9,000,000 gallons. The old equipment guaranteed a capacity of filtered water of 6,000,000 gallons. Frequently the department has been forced to pump 8,000,000 a day into the reservoir. Another improvement is the installation of a 400,000 gallon reserve reservoir near the pumps which will eliminate the troubles experienced when the river flow was low and there was not enough water to properly cover the intake pipes. The work of installing the new addition was handled by the department instead of on contract. Much difficulty was experienced in getting materials and equipment, but considering the limited amount of labor available the job was completed quickly under the management of John W. Philen, superintendent. The original estimate of cost was about \$50,000, but with the advances in costs the cost of the completed job runs somewhat above that figure.

City Fails to Prevent Sale of Lake.

Newark, N. J.—Newark's attempt to prevent the sale of Lake Wawayanda to the New Jersey Zinc Company, based on the fact that the city desired to purchase the property as an additional water supply source, has failed. The state public utilities commission has approved the sale after consideration of the city's claims, with the result that the city will now have to deal with the zinc company if the property is to be acquired. The sale, as approved by the commission, is of the lake and 5,700 acres, mostly woodland, lying in Vernon Township, Sussex County, and in West Milford Township, Passaic County. The tract was owned by the New York Transit Company, a Standard Oil subsidiary, and was disposed of to the zinc company, which desires to use the timber, for \$82,000. The transit company reserves the right to use a thirty-foot right of way for pipe lines and telegraph and telephone lines. Approval of the sale came before the utilities board because the lake is considered to be a public utility, and sales of public utilities must be sanctioned by the board. When the city government learned the sale was under way it sent city counsel Congleton and chief engineer Sherrerd before the board to protest on the ground that the water was needed by Newark for drinking purposes, owing to impending shortage here, and to make an offer of \$85,000 to

the owner. After that briefs were submitted, on behalf of the city and the zinc company. Newark was largely influenced in its attempt to get Lake Wawayanda by the survey made by John R. Freeman, consulting engineer. His report contained the recommendation that the city acquire the lake to provide it with more water, pending the development of the Wanaque watershed. The main point of the city's argument before the commission was that the municipality was more entitled to the use of the water, because of the large number of people to be served, than the zinc company was entitled to the use of the timber. The two companies, however, contended that the city in the last few years had had ample opportunity to obtain the property and that the sale by one company to the other was made in good faith.

Pipes Water Instead of Hauling.

San Francisco, Cal.—The United States Government plans to purchase water from the Marin municipal water district for the use of military stations on Angel Island. The government is at present paying 50 cents a thousand gallons for water hauled in tank boats from San Francisco to the island, about 400,000 gallons being the daily consumption. The Marin water district has agreed to furnish water through a pipe line at the rate of 10 cents a thousand gallons.

STREET LIGHTING AND POWER

City Not Allowed to Finance Water Power Development.

Watertown, N. Y.—The city's water power resources will not be developed until after the war. The Capital Issues committee, to whom application had to be made, has disapproved the expenditure of money for this development at the present time. Last June, city attorney Hooker made application for permission to spend \$50,000 in this improvement. The application has been denied as incompatible with national interest. The bonds for this improvement were sold some months ago and the money has been placed to the credit of the city. At the time the application was made it was thought by the city attorney that \$50,000 might be spent in the development this year.

Vote for Municipal Electric Plant.

Maquoketa, Ia.—At a recent special election, the voters approved the plan to instal a municipal electric light and power plant to be operated in connection with the city water works system. This same project was voted on in December, 1916, at which time it was approved by a majority vote. Litigation started by the local electric company, however, delayed work, and the city lost in the final decision of the court on technicalities. At the recent election, however, the plan was reapproved by a 5 to 1 vote. Bonds amounting to \$65,000 were voted. It is not probable that anything more than preliminary work will be done until after the war, according to G. B. Morse, superintendent of the water department.

Thirty Per Cent Gas Rate Increase.

Providence, R. I.—The Providence Gas Company is now charging \$1.30 for gas, instead of \$1, under a 30 per cent increase granted by the public utilities commission on the company's petition for authority to charge 35 per cent more. The commission declares that "the application of the company for a rate increase is frankly stated to be an emergency proceeding," and promises to reconsider and readjust the increased rates when and if the company's new coke oven plant makes the cost of manufacturing gas cheaper. Besides allowing 30 per cent more to be charged for gas to consumers in this city, East and North Providence, Johnston, Smithfield and Warwick, the commission sanctions a rate of \$1.45, instead of \$1.15 in the Riverside territory served by the utility. The commission's decision justifies the higher prices for gas on the ground that the circumstances of war have "greatly increased the costs of gas materials which the company is now bearing

and with which it is confronted for the future." In the summary of the hearings and especially of the testimony, presented by Alton D. Adams, who presented the protest in behalf of the city of Providence, and of Walter M. Russell, the company's superintendent of manufacture and chemical engineer, the commission takes up one by one the items on which there was a difference of opinion, concerning the company's operating expenses over the past six years. Taking up the first difference, that of the cost of materials, the commission finds that "Mr. Russell has presented his calculations in detail and has shown himself to be well qualified as a practical and experienced superintendent of manufacture of gas, while Mr. Adams, although of long experience in the matters concerning the valuation of gas plants and rate proceedings, has never been charged with the responsibility for the actual operation of such plants. Under such circumstances we believe that Mr. Russell's figure is substantially correct."

Both sides agreed on manufacturing labor costs, the commission relates, going on then to the radical difference over the cost of plant repairs and all depreciation. Here again the commission accepts the company's, rather than Mr. Adams's figures, stating that the latter's total, for May, 1918, of \$33,013, includes items amounting to \$12,864, which cannot be called repairs, and that the total should be \$20,149 instead. As for depreciation allowance, the commission cites the fact that "Mr. Adams, although at first testifying that in his opinion five cents, per 1,000 feet of gas sold, was an adequate depreciation allowance, later admitted that in view of the increased cost of materials and labor now prevailing he would not say that the company's estimate of 6.4 cents, per 1,000 feet sold, was excessive."

The report deals at length on the difference of opinion which arose frequently during the hearings over what are repairs and what is depreciation. Mr. Adams contended that the company's depreciation had already been charged once to repairs; that, in other words, equipment, repaired, renewed or improved, is not depreciated.

Referring to this view taken by Mr. Adams, the commission's report remarks that, "We are unable to find any authority for the application of such a rule, which seems to ignore utterly the depreciation due to obsolescence." It continues: "The testimony does not show that the company has improperly included items for repairs, and we believe that it has not been shown that the company's expense for repairs is unusual under the existing conditions. The exceptionally severe conditions of the last winter have an important bearing upon this matter, and would account for some of the increase out of the ordinary as to the items of repair."

"We therefore conclude that the company is entitled to and should make a proper allowance for depreciation in addition to the item of repairs, and that this item has not been shown by Mr. Adams to be sufficient to offset depreciation as he has alleged."

The subject of taxes, next in the list of differences, is disposed of by the commission by pointing out that, even though Mr. Adams's figure of 5.39 cents was correct for the past, the rate for the present year will be 6.67 cents per 1,000 feet of gas sold.

Coming to the matter of "other expenses," the commission says that the items which Mr. Adams classed as repairs belong under this head, and that, accordingly, the rate would be 20.57 cents per 1,000 feet of gas sold. After citing Mr. Adams's opinion, based on experience elsewhere, that 10 cents is a liberal allowance, and that 20.57 cents is "extravagant and more than double the amount necessary," the commission admits that comparisons reveal the fact that this is a high rate, but attributes this high rate to the "much larger output of gas to which these overhead expenses would apply, being nearly double that of the largest cities with which the comparison is made." The commission adds that, at all events, "it is apparent that no recent substantial increase has been made in the expenditures under these items."

Matter of Salaries.

Salaries, the report goes on, are "not excessive for a company of this size," and "general office salaries certainly cannot be called excessive."

However, the commission sees in these "other expenses" an opportunity for a curtailment of expense, although that would entail also, it is pointed out, a curtailment of "those activities of the company whereby it comes in contact with its consumers." This would deprive the consumer of "certain elements of service to which he has long been accustomed," the report says, but "it is here and here only that economies to suit the emergency situation can possibly be effected."

And, although the commission states its disagreement with Mr. Adams, in that his estimate of 10 cents for "other expenses is low," the commission is "not prepared to say that the company has clearly justified its estimate of the amount necessary for these items, as a basis for its reasonable requirements for the future."

The last subject discussed is that of "interest and dividends." The commission, using estimates of Mr. Adams as a basis, contends that only 4.3 per cent would be left for a dividend on the outstanding capital stock; that Mr. Adams has used a "mystic figure of \$2.50, and without further ado," arrived at a valuation of \$5,250,000, which is \$1,500,000 less than the book value, minus depreciation, and that Mr. Adams has ignored "the fact that every share of the capital stock of the company, totaling \$6,300,000, has been paid for in cash at par."

The commission's conclusion on this subject is that "no evidence has been produced in this investigation to show that the fair value of the property of the company does not equal

its capital stock outstanding," and that the company's estimate of 27.50 cents for interest and dividends is not excessive "for the requirements of an 8 per cent dividend."

The report of James T. Swan, the accountant hired by the commission to examine the company's books, is included in the decision, and from it, the deduction is drawn that unless higher rates are permitted the company would have "remaining practically nothing for dividend requirements."

The commission then points out that a 30 per cent increase in rates, as indicated in Mr. Swan's report, would produce additional revenue approximately at the rate of \$50,934.13 per month. However, a 30 per cent increase in the rate of 75 cents per 1,000 feet for amounts in excess of 250,000 cubic feet, of a price of 97.5 cents "would not, in the opinion of the commission, adequately compensate the company," and this entire rate, or step, is ordered eliminated, and replaced by a charge of \$1.04 for amounts in excess of 125,000. This is more than a 30 per cent increase, or as the commission words it in its decision, it is a "30 per cent increase over the existing rate of 80 cents," instead of over the rate of 75 cents. The following is the new schedule of rates:

For gas sold in the cities of Providence and Cranston and the towns of North Providence, Johnston, Smithfield, Warwick and East Providence, except in the Riverside district of said town of East Providence:

	Gross.	Net.
For the first 5,000 cubic feet used in any one month	\$1.40	\$1.30
For the next 5,000 cubic feet used in any one month	1.33	1.23
For the next 40,000 cubic feet used in any one month	1.27	1.17
For the next 75,000 cubic feet used in any one month	1.20	1.10
For all in excess of 125,000 cubic feet used in any one month	1.14	1.04

For gas sold in the Riverside district of East Providence:

	Gross.	Net.
For the first 5,000 cubic feet used in any one month	\$1.55	\$1.45
For the next 5,000 cubic feet used in any one month	1.48	1.38
For the next 40,000 cubic feet used in any one month	1.42	1.32
For the next 75,000 cubic feet used in any one month	1.35	1.25
For all in excess of 125,000 cubic feet used in any one month	1.29	1.19

The company shall allow the discount of 10 cents on each 1,000 cubic feet of gas consumed in any one month whenever the bill for such gas is paid within 15 days from the date of the bill.

The company shall be permitted to charge a minimum rate of 50 cents per month, subject to a refund if the consumer's bill exceeds the sum of \$6 per year.

FIRE AND POLICE

Police Department Expenses Reduced.

Indianapolis, Ind.—George V. Coffin, chief of police, has completed a survey of the operating expenses of the Indianapolis police department for the first six months of 1918. The survey contains comparative figures covering the same period in 1917, during the previous administration, and it shows that the department is being operated at a saving of nearly \$1,000 a month over the same period in 1917. The report does not take into consideration the police force salary fund except to this extent: During the first six months of the 1917 administration \$251,062.98 was expended for the payment of salaries to members of the department. During the similar period of 1918 the sum of \$261,282.23 was expended, an increase of \$10,219.25. This is due to the fact that about February 1, 1918, the city council granted an increase to policemen of approximately 10 per cent for all members of the department. The records of the department show that during the first six months of this year \$14,609.37 was paid out of the twenty-one funds by which necessary department expenditures are cared for. During a corresponding period of 1917 the expenditure was \$20,354.38. The difference is \$5,745.01. Special care has been taken in the purchase of so-called incidentals in the police department. Except in a few instances no purchases have been made without the direction of the purchasing agent. One of the distinct reductions in operating expense comes from the elimination of the maintenance of four costly sub-stations, the bicycle teams formerly housed there now

having quarters in the engine houses of the city. The department has already saved more than \$500 by this change. The station house salary fund shows a saving of \$1,306.46. This is the fund which is used to pay janitors and other help employed at police headquarters. It is well known that this fund has been used in the past to care for political help. The auto maintenance and repair fund show a saving of \$2,716.26 for the six months. In the first six months of 1917 \$4,635.79 was expended for the maintenance and repair of automobiles. This has been cut to \$1,919.53. Despite the increased cost of coal and other essentials a saving of \$236.93 has been effected in the fuel and heat expenditure for police headquarters. The gas and electric light expenditure has likewise shown a decided improvement despite the increased rates. The sum of \$226.04 has been saved during the six months' period. In the safety zone expenditures, where all traffic expenses is lodged with the exception of the payment of salaries to traffic officers there has been a saving of \$409.58. The electrical department has spent \$1,513.80 less than was spent for the same department during the previous similar period. It has been necessary to make changes and repairs in the police headquarters building. Leaky roofs and other necessary repairs have caused an expenditure of \$344.40 more than was spent during the corresponding period last year.

Motorizing Apparatus as War Economy.

Denver, Col.—Because of the high cost of keeping the fire department horses, the city's fire-fighting apparatus is to be motorized as soon as funds become available for the purpose. Each of the sixty fire horses eats one dollar's worth of feed per day, the annual feed bill during the war period being estimated at \$21,900. As a result, five new pieces of motorized apparatus will be added from this year's revenue, and the number of horses reduced by eleven. Within a few weeks a new triple combination will be received and installed at the Flyria fire house to furnish protection to the stock yards. By next February another combination will be ready to respond to alarms in the South Denver section, including homes and essential war factories. Each pumper will cost \$11,770. Bids have been asked on three tractors, two of which will be placed upon aerial trucks and one of which will motorize the steamer. This apparatus will be received next February. To completely motorize the fire department according to figures submitted by manager of safety D. C. Bailey, would cost \$179,000. At the present moment Denver has nine major pieces of motorized fire apparatus. On the strength of this year's additions, mayor W. F. R. Mills and manager Bailey expect a substantial decrease in the city's high fire insurance rates, and will bring the question prominently before the underwriters and the public soon.

Airplane Helped Fight TNT Fire.

Morgan, N. J.—Eight million pounds of TNT were saved from destruction during the recent fire at the Gillespie shell-loading plant here, by an army airplane, which flew over the wrecked works at an altitude of 1,000 feet, and directed the fight against the flames. The War Department at Washington has formally announced the feat, disclosing that the plane was piloted by Lieut. Cyrus F. Smythe, with Major H. L. Armstrong as observer.

Big Loss at Oil Pier Blaze.

Seattle, Wash.—More than half of the Great Northern Railroad's oil pier here is in ruins as the result of a fire. The damage is estimated at between \$1,500,000 and \$2,000,000, partly covered by insurance. Two Japanese liners moored at the Seattle port commission's wharf were trapped by burning oil and could not be towed to safety. Great squares of canvas were let down over the sides and streams of water kept playing on them to prevent the steel plates from buckling. The vessels were slightly damaged. It is believed the fire started by an explosion in an

oil room at the outer end of the pier. The whole of the city's land and marine fire fighting equipment was at work and was aided by a heavy downpour of rain.

TRAFFIC AND TRANSPORTATION

Car Strike Follows Election in Buffalo.

Buffalo, N. Y.—The cars of the International Railway, here and in Niagara Falls, have been tied up by a strike following the refusal of the company to grant its men higher wages. The company says it is unable to pay them because of the failure of the movement to obtain higher fares. The city council recently passed an ordinance granting a 6-cent fare, but the voters disapproved it by a five to one majority. The 6-cent fare proposal came as a result of an award by the war labor board of a wage scale of forty-three to forty-eight cents an hour to employees, an advance of about 25 per cent contingent upon the granting of a 6-cent fare. The award would have added approximately \$1,600,000 a year to the company's payroll. The men stood firm in their demand for the raise and service was completely suspended. A number of plans are being urged to break the deadlock. The company is attempting to operate cars, but there has been no disorder.

Seven-Cent Fares in New Jersey.

Trenton, N. J.—Seven-cent fares, where five cents is now charged, will become effective on all lines of the Public Service Railway Company, October 15, and will continue in force until March 31. From that date a six-cent fare will be charged while the present war emergency conditions continue, or else a zoning system will be adopted if arranged for a time. These increases in the straight fares have been announced in a decision of the public utilities commission and are in addition to the one-cent charge for each initial transfer. They were allowed to enable the company to raise the additional revenue required to meet the wage increases ordered by the National War Labor Board, August 1 last, the increases being made effective as of June 7. "It is an outrageous decision and very significant, coming right after the primaries," said mayor Charles Gillen, of Newark, commenting on the decision. "The city of Newark has contracts with the Public Service for five-cent fares and there isn't any person or court on earth that has the right to break those contracts except the parties thereto. Under the agreement by the members of the League of New Jersey Municipalities, we will appeal the case the same as we did when a one-cent charge for transfers was granted. I expect to communicate with mayor Segar, president of the league in regard to going ahead with the appeal." In its voluminous opinion, which is supplemental to that permitting the increase of one cent for initial transfers, the public utilities commission discussed mainly the practical effect of the War Labor Board's decision on the wage question. From testimony produced by the Public Service Railway Company and verified by experts of the board it reached the conclusion that the excess in wages, including the deficit accruing between June 7 and October 15 would be approximately made up by a seven-cent fare for the period of five and a half months, beginning October 15. From that time on it was estimated that a six-cent fare would meet the excess in wages above that already provided for through the charge of one cent for each initial transfer. The order of the board requires the trolley company to file an acceptance of conditions imposed by the board not later than October 10. These conditions, which are generally similar to those imposed in the transfer proceedings, stipulate that the Public Service shall file a monthly statement, beginning with October, giving the total amount of wages and salaries paid, classified by the character of service rendered, and the rates per hour, day or period for which the wage or salary is payable, and indicating any change in classification of employees and the wage rates resulting therefrom. The company is also to file a monthly statement, showing in detail comparative incomes in accordance with the uniform system of accounts prescribed by the

board. In its consideration of the rate question the commission adverted to the fact that following the filing of the company's petition August 6 last there appeared at the hearing in Newark in addition to counsel for the company and the league of municipalities representatives of large governmental, industrial, manufacturing and financial institutions, chambers of commerce and boards of trade of various municipalities. Most of these representatives presented memorials urging the necessity of the functioning by the railway company at its maximum efficiency and the allowance of such a rate of fare as would provide sufficient funds. Arrayed against these representatives were counsel for numerous municipalities and some citizens who protested against the allowance of any increase in the rate of fare. The board pointed out that the only evidence presented was that of the company, there being no testimony by any of the agencies or municipalities appearing.

"The board welcomes," continued the opinion, "the presentation of facts which will aid it in reaching a fair and equitable determination of any controversy in any proceeding before it, but the mere approval or protest in a proceeding fixing a rate charged or to be charged by a utility does not aid the board in arriving at its conclusions. While the memorials were permitted to be filed and the protests to be entered on our record, neither constituted evidence nor testimony and could not be considered by the supreme court on review of our findings."

After summarizing the findings in the original rate case in which the transfer increase was granted and the subsequent decision of the National War Labor Board, the commission gave its reasons for considering at this time only the effect of the labor board's decision upon conditions existing up to that time. All the other questions involved, it said, had been fully considered and disposed of in the previous opinion. As pointed out by the commission the additional charge for transfers was designed to realize for the company additional revenue of \$860,000 to permit the wage increases which President Thomas N. McCarter testified were necessary. In its calculations the board placed these wage increases at \$1,086,000 and provided that this sum should be appropriated toward any increase allowed by the National War Labor Board. What would otherwise appear to be a simple mathematical problem, the board said, was complicated by the fact that the award made by the labor board was retroactive, thereby making it imperative for the railway company not only to pay the increased scale of wages as they become currently due, but in addition wages in excess of those already paid accruing since June 7 last.

"Having ascertained the amount of these as accurately as possible," continued the board, "consideration must be given to the time within which the necessary revenue must be raised. This vitally affects the amount of the increase allowed. If the additional revenue were required to be raised during the balance of the present year an inequitable and certainly prohibitive increase in fare would result."

"In order that the patrons of the railway company may not be unduly burdened, and at the same time that the petitioner may not be financially embarrassed, some plan must be adopted which will be equitable both to the public and the company. Having adopted some such plan, a further adjustment then becomes necessary. The company being reimbursed for the deferred wages, the revenues then need only provide for the current increased wages and the rates of fare should accordingly be reduced."

The board showed that from statements of counsel for the company a seven-cent fare, with an additional charge of one cent for a transfer, in effect between September 15 and December 31, would yield sufficient revenue to make up the difference of approximately \$860,000 between the actual wage increases paid and to be paid during the last five months of 1918 and the amount of wage increases for which provision was made in fixing the present fare of five cents with a one cent charge for a transfer. This, as pointed out by the board, is equivalent to approximately \$245,000 additional revenue per month, and is somewhat larger than the estimated average monthly increased revenue at the higher fare, namely, \$212,000, the difference representing the greater traffic that usually occurs during the last few months of the year than in other months. As indicated in exhibits of the company, the excess of the total annual wage increases effective August, 1918, over the amount of wage increases for which provision was made

in fixing the present fare, is \$1,630,000. The excess from August 1 to December 31, a period of five months, the board said, would be five-twelfths of this amount, or \$680,000.

Further analyzing the testimony of the company, the board said, the excess up to the close of 1918 will be approximately \$860,000. Subtracting from this the \$680,000, leaves \$180,000 as the amount of deficiency in revenue or deficit, August 1, which covers that portion of the items applicable to the period prior to August 1. During each month at the present rate of fare the board estimated that the deficit will be increased by \$136,000, so that on September 15 it was \$384,000, and on October 15 will be \$520,000.

Statements made by counsel for the company indicated that the entire amount of the deficit accruing up to September 15 would be practically wiped out at the close of the year by raising the fare on the former date from five to seven cents. At the same average monthly gain in revenue, the loss of \$520,000 accruing up to October 15, the board said, would be made up in approximately five months. As shown by the evidence, however, the decreased traffic during the winter months results in the falling off of revenue, the conclusion of the board, therefore, being that March 31 would be the proper limit to fix for the seven-cent fare.

In addition to fixing the rate of six cents, beginning April 1, the commission said:

"By its report of July 10 this board ordered the petitioner to file and submit to it on or before January 1 next a plan whereby the method of charging at present in force may be revised by an equitable zoning system over its entire territory, proper consideration being given to all of the elements to more properly relate the cost of service with the length of haul and value of service.

"The company is now and has been for some time past gathering data of traffic on its lines to be used in the preparation of such a plan and the president of the petitioner assured the board that such a plan will be filed and submitted to us early in January next. Any plan submitted will necessarily have to be investigated by experts employed by the board before adoption to ascertain the fairness of the scheme and the probable results of operation.

"We anticipate that it may be possible to adopt some plan before April 1. The plan with its schedule of rates when adopted will be substituted for the then existing rate."

STREET CLEANING AND REFUSE DISPOSAL

New York City's Garbage Difficulties.

New York, N. Y.—All of the garbage of the city—between 600 and 700 tons daily—is now being dumped at sea and will continue to be for an indefinite period. Street cleaning commissioner Arnold B. McStay said that the order of the health department closing the garbage disposal plant of the Metropolitan By-Products Company on Staten Island as a public nuisance left no other method of handling it. The commissioner was still of the opinion that it was not the plant itself, but the method of operating it that had constituted the nuisance. "The plant is one of the finest and most up-to-date in the world. Due to lack of proper care, however, the machinery has been allowed to run down and develop leaks and the unloading of the garbage from scows at the company's docks has lagged until the garbage accumulated and became old." There has been a long-standing difference between the city and the operators of the disposal works regarding methods of payment. Whether the plant will be continued under other management commissioner McStay is unable to state. Efforts in that direction were being made, he said. It is understood Proctor & Gamble, soap manufacturers, who have a plant on Staten Island, have made an offer to operate the plant. The Federal Government has also been asked to take it over. At the office of the street cleaning department it was said that the garbage scows were taken 19 miles beyond the Scotland Lightship before being dumped. In giving his order health commissioner Copeland said: "At the various investigations 200 witnesses have been heard, including a number of experts on garbage disposal. As a result of testimony brought forward under the personal direction of corporation counsel William P. Burr and his assistants, the board of health has taken this formal action. The board declared at its session that the accumulation of garbage at the dumps, the delay in taking garbage from the dumps, the delay in removing scows from the dumps, the careless transportation of the scows to Lake Island, the retention of scows at the dock at Lake Island and the method of garbage disposal at the plant at Staten Island, all constitute a public nuisance, and the

board issued an order notifying the receivers of the company that the nuisances must be abated forthwith." Investigation by the health department demonstrated that the odors from the Lake Island plant carried 10 miles—in some cases as far as St. George. Staten Island citizens' committees and civic organizations waged a bitter fight against placing the plant and inaugurated a movement for its removal.

Motor Garbage Collection Plan.

Indianapolis, Ind.—The proposed plan of motorizing the hauling of ashes has received the indorsement of members of the city council, who were called by mayor Jewett for an informal discussion of the city's ash hauling problem. The city's contract with the Indianapolis Hauling Company has expired, and many complaints have been received by the board of works because ashes accumulated during the cool weather last month have not been taken away. Dwight S. Ritter, city purchasing agent, will advertise for four motor trucks and twenty-four dump trailers, which, according to his estimate, will cost about \$60,000. He has been studying the method of ashes and garbage collections in other cities, and says it has been proven that this cost can be saved within two years, based on the factors of speed, capacity and the number of men required to operate motor equipment, as against the old horse-drawn equipment. The plan proposed is to have the ashes collected in dump trailers hauled by horses, which, when filled, are left at certain designated stations, to be picked up and hauled to the dumping grounds by the motor trucks. Twelve trailers will be operated each day. The plan is to divide the city into seventy-two districts so that ashes from every part of the city will be collected once a week.

Women Street Cleaners.

Louisville, Ky.—Twenty-eight negro women have appeared as officially appointed street cleaners in Louisville. They receive \$2 a day for nine and a half hours and each cares for a territory eight blocks square. They will receive uniforms, something like those of the "white wings" worn by men, as soon as they prove their capability. They came in many garbs, one wearing a new suit of overalls, a man's hat and hob-nailed shoes. Superintendent Charles Oestreich, of the street cleaning department, said the experiment, if successful, will solve an important labor shortage problem.

MISCELLANEOUS

City Buys Fair Grounds.

Sheridan, Wyo.—Through the action of the city council, Sheridan now possesses municipally-owned fair grounds. Council decided that the city will buy the grounds and improvements over the adverse vote of mayor Camplin, who feared the impending inroads upon municipal funds arising from the loss of the license money from the saloons. He also thought the city has enough parks. The decision to purchase these grounds is but an act of good faith on the part of the city toward the citizens who undertook to prevent the abandonment of the fair grounds through foreclosure proceedings. This tract was purchased originally by the Fair Grounds Association from a former owner. It was not a paying investment, and about a year ago the mortgage holder was disposed to foreclose for the realization of something over \$4,000 due him. Thereupon ten Sheridan citizens, in agreement with the then city council, took over the notes and mortgage to hold until the city could make financial provision to acquire them. In pursuance of that agreement the council of last year appropriated \$4,000 as half of the price to be paid for the grounds, but that sum has never been paid over. There are forty acres in the tract, with water right accruing, and such buildings thereon as have been erected for the necessary service of the fair, together with the fence around the tract.

NEWS OF THE SOCIETIES

Nov. 6-8.—CITY MANAGERS' ASSOCIATION. Fifth annual convention, Roanoke, Va. Secretary, H. G. Otis, city manager, Auburn, Me.

Nov. 12-16.—NATIONAL TAX ASSOCIATION. Annual conference, St. Louis, Mo. Secretary, Fred R. Fairchild, Yale University, New Haven, Conn.

Nov. 14-15.—WASHINGTON STATE GOOD ROADS ASSOCIATION. Annual convention, Pasco, Wash. Secretary, Clancey M. Lewis, Seattle, Wash.

Nov. 14-16.—ASSOCIATION OF URBAN UNIVERSITIES. Annual convention, Boston, Mass. Secretary, Frederick B. Robinson, College of the City of New York, N. Y. C.

Nov. 20-22.—NATIONAL MUNICIPAL LEAGUE. Special Conference on Reconstruction, Rochester, N. Y. Secretary, Clinton Rogers Woodruff, North American Bldg., Philadelphia, Pa.

Nov. 26-28.—UNION OF MANITOBA MUNICIPALITIES. Annual convention, Winnipeg, Man. Secretary, Robert Forke, Pipestone, Man.

Dec. 3-6.—AMERICAN SOCIETY OF MECHANICAL ENGINEERS. Annual meeting, New York, N. Y. Secretary, 29 West 39th St., New York City.

International Association of Municipal Electricians.

The twenty-third annual meeting of the International Association of Municipal Electricians was held at the Piedmont Hotel, Atlanta, Ga., September 24 to 27. The papers were very instructive, and despite war conditions there was an unusually large attendance.

The meeting was opened by an address of welcome by A. G. Candler, mayor of Atlanta, and a fitting response in behalf of the delegates was made by Dr. Charles P. Steinmetz. Following the presidential address of C. E. Diehl, city electrician of Harrisburg, Pa., the report of the Municipal Electrical Standardization Committee was presented by R. A. Smith, superintendent of electrical affairs, Norfolk, Va.

"Standard Specifications for Underground Fire-Alarm and Police Signal Cable" was the title of a paper by John Berry, superintendent of fire alarm, Indianapolis, Ind.

An address on "The Application of Science and Electrical Engineering" was delivered by A. M. Schoen, chief electrical engineer, Southeastern Underwriters' Association, Atlanta, Ga.

"Police Call, Report and Signal System" was discussed by Jacob Grimm, superintendent of police signal system, Buffalo, N. Y.

Illustration by motion pictures and lecture of electrical development and manufacture, by F. A. Barron, Schenectady, N. Y.

The following papers and addresses distinguished the other sessions:

"History and Development of the Fire-Alarm Telegraph," by J. B. Yeakle, superintendent of fire alarm, Baltimore, Md.

"Development, Cause and Location of Trouble in Rubber Insulation," by

B. S. Stewart, of the Peerless Insulated Wire & Cable Company, New York, N. Y.

"The Joint Use of Poles by Public Service Wire Companies," by A. L. Pierce, electrical engineer, Wallingford, Conn.

Address: By Dr. Morton G. Lloyd, electrical engineer in charge of safety work of Bureau of Standards, Washington, D. C.

Address on "How the Municipal Electricians Can Help in Fire Prevention," by Washington Devereaux, president of National Association of Electrical Inspectors and of the Electrical Department of Underwriters' Association, Philadelphia.

"The Sale and Purchase of Non-Approved Electrical Appliances and Material," by F. A. Cambridge, city electrician, Winnipeg, Man., Canada.

Address on "Practical and Technical Application of Electrical Science," by Dr. Charles P. Steinmetz, consulting electrical engineer, Schenectady, N. Y.

"Importance to the Public of Inspection of Interior Wiring," by William S. Boyd, secretary of Western Association of Electrical Inspectors, Chicago, Ill.

"Educating the Public in the Use of the Fire-Alarm Box," by John W. Mangum, city electrician, Raleigh, N. C.

"A Code of Electrical Rules for Municipal Inspectors Covering Both Fire and Accident Prevention," by Dr. M. G. Lloyd, electrical engineer, Bureau of Standards, Washington, D. C.

"Underwriters' Laboratory Tests as Applied to Electrical Material in War Times," by A. R. Small, vice-president of the Underwriters' Laboratories, Chicago, Ill.

"The Advantages of a Police Patrol System to a Municipality," by E. E. Salisbury, signal engineer, Boston, Mass.

Illuminating Engineering Society.

The twelfth annual convention of the Illuminating Engineering Society was held in New York City on October 10. After the business meeting and report of council had been dealt with, President H. H. Stickney delivered a brief address, after which F. E. Cady, chairman of the Committee on Progress, briefly summarized this committee's report. Dr. E. P. Hyde, president of the United States National Committee of the International Commission on Illumination, explained that, owing to the war, nothing could be done other than to keep together and try to pave the way toward cooperation after the war. The convention was honored by the presence of F. M. Hugo, Secretary of State of New York, who spoke upon the New York State automobile headlight law. This was followed by a few remarks by Dr. C. H. Sharp, chairman of the Committee on Automobile Head-

lighting Specifications. The report of the Committee on Lighting Legislation and Statement Concerning Work of the Divisional Lighting Committee was briefly abstracted by Chairman L. B. Marks, and the report of the Committee on War Service was delivered by Chairman P. S. Miller. T. C. Martin, charter member of the society, spoke a few words in behalf of the Fourth Liberty Loan.

Features of the afternoon program were: "Lighting of Cantonments," a discussion by Bassett Jones; "War-time Lighting Economics," presented through the efforts of the Committee on War Service; "Productive Lighting Intensities," by W. A. Durgin of Chicago; "Protective Lighting," by Edmund Leigh, chief of plant protection, military intelligence; "Relation Between Light Curtailment and Accidents," by R. E. Simpson, and "Standardization of Metal Reflectors," by Ward Harrison. After this came the formal introduction of George A. Hoadley, the new president of the society for the ensuing year.

In the evening a dinner and program was given in the ballroom of the Hotel McAlpin, presided over by D. McFarlan Moore, chairman of the Convention Committee. A scholarly address was made by Col. R. A. Millikan of the National Research Council (professor of Chicago University). The program was concluded by the presentation of a four-reel film upon the "Training of the Soldier," by courtesy of the United States Army General Staff.

PERSONALS

Brown, Dr. Lucius Polk, director of the bureau of food and drugs, health department, New York City, has accepted a commission as captain in the United States army. As captain in the food and nutrition division of the Sanitary Corps of the Surgeon-General's office he will receive a salary of \$2,400 a year, against the \$5,000 yearly salary the city paid him. Dr. Brown was recently reinstated following suspension under unsustained charges.

Lee, Virgil, formerly of the county surveyor's office, Madison county, Indiana, has been appointed city engineer of Anderson, Ind.

MacFarland, Finlay has been appointed president and general manager of the Denver water plant. He was a member of the board of five citizens selected by the city government to manage the plant of the Denver Union Water Co. after it was taken over by the city following the recent election.

Olsen, Edward T., resident engineer, New Jersey state highway commission, with headquarters at Trenton, has been commissioned a first lieutenant in the Engineer Officers' Reserve Corps and assigned to duty at Camp Humphreys, Va.

Howell, Robert P., for 14 years city engineer of Phillipsburg, N. J., for

four years of which period he was also commissioner, has been commissioned captain, Quartermasters Corps, U. S. A., and is stationed at Camp Gordon, Ga., as officer in charge of the Water and Sewer Section.

INDUSTRIAL NEWS

Cast Iron Pipe.—Permission to obtain pipe for municipal purposes is difficult to obtain, even for the most important extensions. Government prices for New York are: \$67.70 for 6-inch and heavier; \$70.70 for 4-inch; \$77.70 for 3-inch; class A, \$1 extra. Chicago: 6-inch and larger, \$66.80; 4-inch, \$69.80. San Francisco: \$83.20 for 6-inch and larger; \$86.20 for 4-inch. Pig iron is getting scarcer. Sanitary pipe is almost unobtainable.

Koppel Industrial Car & Equipment Co.

The Koppel Industrial Car & Equipment Co. is the name of the subsidiary of the Pressed Steel Car Co., which will take over the business of the Orenstein Arthur Koppel Co., builder of industrial cars and equipment, Koppel, Pa. The plant was recently sold to the Pressed Steel Car Co. by the Alien Property Custodian.

Blasters' Handbook.

A pocket text book called the "Blasters' Handbook" has just been issued by E. I. du Pont de Nemours & Company, of Wilmington, Del., which tells in detail how to use explosives for every purpose where their employment is practicable from blowing soot from big chimneys to breaking up old boilers and heavy machinery.

This book gives valuable information regarding the proper explosive to use, the quantity, the method of loading and firing. It is profusely illustrated and contains charts and diagrams that make this work a valuable addition to any technical library. It does not go into exhaustive detail in many cases, but cites references to other books. These are:

"High Explosives," Sections 1 and 2, which gives detailed information on high and low explosives.

"Blasting Supplies," which covers fully the subject of blasting supplies and their uses.

"Blasting Powder," which describes the uses of blasting powder.

"Road Building and Maintenance"—A treatise on road building.

"Shale and Clay Blasting"—On mining clays.

"Pole and Post Holes"—On digging them.

"Handbook of Explosives"—On a variety of uses, especially in drainage and land clearing.

Any of these can be had free of cost, by those interested in blasting, by addressing a card to the Du Pont Company, Wilmington, Delaware.

The Barrett Company has published a new booklet dealing with the use of Tarvia on private estates. The treatment of driveways and roads on estates with "Tarvia-A," "Tarvia-B,"

"Tarvia-X" and "Tarvia-KP" is fully explained and some splendid results of their use are shown in the full-page illustrations. The examples include the Pan-American Building at Washington, D. C., and Riverside Drive, New York City.

Fuel Restriction for Cement Industry.

The U. S. Fuel Administration has announced a 25 per cent cut in production of cement plants as follows:

1. That the term "cement" in this regulation shall be construed to cover all Portland cement, natural cement, and Puzzuelan (slag) cement made by any process whatsoever, as those terms are customarily used in the trade.

2. That the term "manufacturer" in this regulation shall be construed to cover any person, firm, association, or corporation engaged in the manufacture of cement.

3. No manufacturer, as defined above, shall at any of his plants consume, burn, or use fuel of any description, including coal, coke, natural gas, fuel oil, or other petroleum products, or use power derived from any such fuel, for or in connection with the manufacture of cement, as above defined, during the year beginning January 1, 1918, and ending December 31, 1918, to an amount in excess of the amount required to manufacture 75 per cent of the average annual production of cement at such plant during the period from January 1, 1915, to December 31, 1917.

Excepting—

First. In case such plant was not in existence on January 1, 1915, then and in such case the period during which it had been in existence prior to January 1, 1918, shall be used as a basis in arriving at a determination as to the quantity that would constitute 75 per cent of the average annual production.

Second. That any manufacturer of cement may burn fuel for the manufacture of cement in excess of the amount provided for in this order whenever permission in writing for such excess production is granted by the United States Fuel Administration to such manufacturer—

(a) Upon evidence that the necessities of the Government in the particular district in which such manufacturer is located can not be supplied by plants within practical shipping distance of the place where the United States Government requires such product, unless permission is granted for such excess production, and that on this account it is necessary in the interest of the United States Government that such permit be issued.

(b) Upon receipt of certification from the fuel administrator of the State in which the plant is located that the material to be manufactured is to be used in connection with building operations of urgent public necessity and that the fuel used in manufacturing such material can be spared for such purpose.

Third. That whenever two or more manufacturers of cement shall find that a further fuel economy would result from combining and using jointly the allotments of fuel to their several plants permitted by this regulation, upon application to the United States Fuel Administration, and upon a receipt of a permit therefor, such manufacturers may use at one or more of such plants to be operated by them jointly sufficient fuel to manufacture 75 per cent of the aggregate of the average annual production of all such plants when operated separately, the manufactured product of such jointly operated plants be-

ing distributed to the individual manufacturers as may be agreed between them.

Fourth. That wood and peat, when not requiring railroad transportation, may be used for the manufacture of cement in excess of the amount provided for in this regulation, and all manufacturers of cement shall, within five days after beginning the use of such wood and peat as fuel for the purposes aforesaid, notify their respective State fuel administrators in writing of the exact time they and each of them began the use of such wood and peat as fuel.

BOOK REVIEW.

MUNICIPAL HOUSECLEANING. By William P. Capes and Jeanne R. Carpenter. 232 pages, 7 tables. E. P. Dutton & Company. \$6 net.

Mr. Capes is director of the New York State Bureau of Municipal Information, and a large part of the data given in this book were obtained by him in this capacity. Miss Carpenter is an expert in economics and municipal research. Mr. Capes is also secretary of the New York State Conference of Mayors, and has dedicated the book to C. C. Duryea, the founder and first president of that conference; while the present president, Cornelius F. Burns, has written an introduction for the book.

The matter is presented in six chapters, dealing with Street Cleaning, Sewage Disposal, Ash and Rubbish Collection, Garbage Collection and Disposal, Care and Disposal of Manure, and Municipal Clean-Up Campaigns respectively. Sixty-eight pages are devoted to street cleaning, forty-six to sewage disposal, thirty-two to ash and rubbish collection, fifty to garbage collection and disposal, ten to the care and disposal of manure and twenty-three to municipal clean-up campaigns. The book is a very complete summary of the practices of the various cities of New York State and the larger cities in the rest of the country, together with quotations from the writings of the comparatively few experts on this subject, the whole being classified under numerous headings and so arranged as to present the subject clearly and in logical order. Where diverse views are entertained by experts or different methods are employed by cities the authors have apparently endeavored to present both sides with equal fairness and to make no effort to weigh the arguments pro and con or to permit any prejudice or preconceived ideas to influence the presentation of the matter. The book is especially rich in data, nearly one-quarter of the pages being devoted to tables, in addition to which there are two large folded inserts containing tabular matter. While most of the data have been drawn from the replies to questionnaires sent out by the New York State Bureau of Municipal Information, other sources also are drawn upon, including the statistical tables on refuse collection and disposal published by Municipal Journal annually in its special numbers devoted to this subject.

ADVANCE CONTRACT NEWS

ADVANCE INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
Ky.,	Madisonville	noon, Oct. 26.	Improving various roads.	Co. Clk., Frankfort, Ky.
Ill.,	Chicago	11 a.m., Oct. 26.	Constructing granite concrete curb; grading and paving with granite blocks on 2 ins. of sand and 6 ins. of portland cement concrete.	Michael J. Faherty, Pres. Bd. of Local Improvements.
Minn.,	Ada	2 p.m., Oct. 26.	Excavation of 17,350 cu. yds., one reinforced concrete culvert, 1 mile road leveling and hauling gravel.	D. E. Fulton, Co. Aud.
Mich.,	St. Clair	7:30 p.m., Oct. 27.	Concrete sidewalks	J. C. Chamberlain, City Clk.
Minn.,	St. Paul	10:30 a.m., Oct. 28.	Improving parkway by grading, curbing, resetting sidewalks, parking, planting, etc.	H. W. Austin, Pur. Agent.
Tenn.,	Jacksboro	Oct. 28.	Macadamizing about 13 miles of pike road.	County Comrs.
N. Y.,	New York	2 p.m., Oct. 29.	Furnishing and delivering 2,000 cu. yds. of binder stone and 5,000 bags of portland cement.	Frank L. Dowling, Boro. Pres. Manhattan.
W. Va.,	Franklin	Oct. 29.	Building roads	G. Boggs, Co. Clk.
O.,	N. College Hill	noon, Oct. 30.	Grading and macadamizing roadbeds and laying necessary drain pipes	L. C. Leroy, Vil. Clk.
O.,	Minerva	10 a.m., Oct. 30.	Improvement of street, involving 1,000 cu. yds. excavation, curbing, block paving and relaying old paving.	Co. Surveyor, Canton, O.
N. C.,	Wilmington	Oct. 30.	Grading and graveling road.	Government Heights Corp.
O.,	North College Hill	noon, Oct. 30.	Grading and macadamizing and laying drain pipes.	L. C. Leroy, Village Clk.
La.,	Alexandria	7 p.m., Nov. 4.	Gravel road with concrete gutters.	City Engr.
La.,	Alexandria	Nov. 4.	Concrete gutters and graveling.	V. M. Ake, City Secy.
Ga.,	Macon	10 a.m., Nov. 4.	Constructing concrete gutters on county road.	Bd. of Co. Comrs.
Ind.,	Fowler	1 p.m., Nov. 4.	Constructing gravel road in Gilboa Twp.	Warren Mankey, Co. Aud.
Ind.,	Lawrenceburg	noon, Nov. 6.	Constructing macadam road in Lawrenceburg Twp.	Harry E. Lutherbeck, Co. Aud.
N. Y.,	Long Island City	noon, Nov. 6.	Paving terminal site.	W. W. Wotherspoon, Supt. of Pub. Wks., Capitol, Albany, N. Y.
N. Y.,	Troy	noon, Nov. 6.	Grading terminal site.	W. W. Wotherspoon, Supt. of Pub. Wks., Capitol, Albany, N. Y.
Ind.,	Jeffersonville	10 a.m., Nov. 4.	Improvement of highway by grading, draining and paving with macadam.	Geo. W. Stoner, Co. Aud.
Tex.,	Belton	11 a.m., Nov. 7.	Construction of road.	State Hwy. Dept., Austin, Tex.
Fla.,	Pensacola	noon, Nov. 12.	Road construction in Oskaloosa Co., Fla., approximately 27.92 miles, involving clearing and grubbing, grading, surfacing with sand-clay, and building timber bridges and culverts	District Engr., Montgomery, Ala.
Fla.,	Tallahassee	Nov. 12.	Constructing 30 miles of road.	State Highway Com.
Tex.,	Houston	Nov. 14.	Surfacing with shell.	Chester H. Bryan, Co. Judge.
Tex.,	Houston	10 a.m., Nov. 14.	Hauling and placing shell on road.	H. L. Washburn, Co. Aud.

SEWERAGE.

Pa.,	Beaver Falls	7 p.m., Oct. 28.	Designing, engineering and other services in connection with extension of present outfall sewer, involving about 1 mile of 24-in. sewer.	Harry T. Barker, City Engr.
O.,	Akron	Oct. 28.	Building disposal plant for Summit Co. infirmary.	M. P. Lauer, Engr., 425 Ohio Bldg., Akron, O.
Tex.,	Austin	11 a.m., Oct. 31.	Construction of sewage disposal works.	P. W. Powell, Supt. of Sts. & Pub. Improvements.
Tex.,	Austin	Oct. 31.	Building sewage disposal plant.	C. E. Leonard, City Engr.
Tex.,	Austin	11 a.m., Oct. 31.	Construction of sewage disposal works.	C. E. Leonard, City Engr.
Utah,	Joseph	2 p.m., Nov. 1.	Furnishing and laying 75,000 lin. ft. drain tile; digging 75,000 lin. ft. drain tile trench, 2,000 cu. yds. excavation for open drains; installation of a complete drainage system	Caldwell & Richards, Engrs., 520 Vermont Bldg., Salt Lake City.
S. D.,	Platte	8 p.m., Nov. 4.	Construction of a sewerage system and sewage disposal plant, consisting of approximately 6,100 ft. 15-in. sewer, 1,100 lin. ft. 12-in. sewer, 1,465 lin. ft. 10-in. sewer, 26,075 lin. ft. 8-in. sewer, together with the necessary appurtenances, septic tank, sludge bed and sand filter bed	C. F. Slate, City Auditor.
B. C.,	Vancouver	10:30 a.m., Nov. 11.	Construction of sewer extension, involving 1,300 ft. 4-ft. and 1,500 ft. 5-ft. concrete sewer.	A. D. Greer, M. E. I. C., Engr., 409 Credit Foncier Bldg., Vancouver.

WATER SUPPLY.

Sask.,	Moose Jaw	10 a.m., Oct. 26.	Excavating and backfilling necessary trench and laying about 4 miles of 10 and 12-in. cast-iron pipe; construction of a 40,000-gal. concrete reservoir, building frame pumping station and other necessary work.	Geo. D. Mackie, City Comr.
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BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Ill., Chicago	11 a.m., Oct. 28..	Delivering and installing six water-measuring devices...	Frank I. Bennett, Comr. of Public Works.
N. Y., New York	11 a.m., Oct. 29..	Hauling and laying water mains and appurtenances.....	Nicholas J. Hayes, Comr. of Water Supply, Gas & Elec.
N. Y., New York	11 a.m., Oct. 29..	Hauling and laying water mains and appurtenances.....	Nicholas J. Hayes, Comr., Municipal Bldg., Manhattan.
O., Akron	noon, Oct. 30..	Furnishing water meters, including about 3,000 5/8-in. and 150 3/4-in. to 2-in., and repair parts as required.....	G. P. Hoffman, Dir. of Pub. Serv.
O., Alliance	Nov. 1..	Installing 1,200 ft. high pressure piping, valves, pumps, etc.	W. Shidler, Engr.
O., Hamilton	noon, Nov. 4..	Furnishing pipes, valves, and all machinery and equipment for complete installation of a suction pipe line and connecting to six wells.....	J. J. Sloat, Dir. of Pub. Serv.
Miss., Greenville	Dec. 10..	Furnishing and installing two drainage pumps with combined capacity of 80,000 g. p. m. against low heads, also supplementary machinery and appurtenances.....	Morgan Engrg. Co., Goodwyn Inst. Bldg., Memphis, Tenn.
LIGHTING AND POWER.				
N. Y., Brooklyn	Oct. 28..	Installing heating and ventilating system in building at Naval Hospital Reservation (spec. No. 3508).....	Bureau of Yards & Docks, Navy Dept., Wash., D. C.
Ill., Chicago	11 a.m., Oct. 28..	Delivering seamless steel and lap-welded charcoal iron-boiler tubes	Frank I. Bennett, Comr. of Public Works.
N. Y., Utica	3 p.m., Oct. 30..	Reconstruction of boiler room and changes to central heating plant	Lewis F. Pilcher, State Arch., Capitol, Albany, N. Y.
N. Y., Utica	3 p.m., Oct. 30..	Reconstruction of boiler room (boilers and changes to central heating plant), at the Utica State Hospital....	Lewis F. Pilcher, State Arch., Capitol, Albany, N. Y.
N. D., Fort Totten	2 p.m., Oct. 31..	Installation of a steam heating plant.....	Office of Indian Affairs, Dept. of Interior, Washington, D. C.
N. J., Maplewood	8 p.m., Nov. 6..	Furnishing about 500 ft. single-jacket 2 1/2-in. rubber fire hose	Edward R. Arcularius, Township Clerk.
FIRE EQUIPMENT.				
W. Va., Bluefield	5 p.m., Oct. 25..	Furnishing one triple combination pumping engine, chemical hose car, comprising a 1,200-ft. hose body, 40-gal. chemical tank and 600-gal. pump with 4-cylinder motor.	J. T. Akers, City Recorder.
O., Akron	noon, Oct. 30..	Furnishing about 300 6-in. fire hydrants.....	G. P. Hoffman, Dir. of Pub. Serv.
O., Akron	Nov. 1..	Furnishing one 45-h.p. flusher; capacity of tank, 1,500 gal.; nozzles front and side discharge.....	H. S. Morse, Dir. of Pub. Serv.
N. J., South Orange (Maplewood)	8 p.m., Nov. 6..	Supplying about 500 ft. standard quality rubber, single jacket, 2 1/2-in. fire hose in 50-ft. lengths.....	Edward R. Arcularius, Twp. Clerk.
BRIDGES.				
Ind., Portland	Oct. 26..	Construction of concrete bridges and repair work.....	John Bonifas, Co. Aud.
N. D., Hettinger	Oct. 26..	Construction of six bridges.....	H. J. Stricken, Co. Aud.
Tex., Santa Maria	2 p.m., Oct. 28..	Construction of bridges.....	H. L. Yates, County Judge, Brownsville.
Ind., Marion	2 p.m., Oct. 30..	Construction of steel or concrete bridge.....	Mort McRae, Auditor.
O., Cincinnati	noon, Nov. 1..	Renewing floor on bridge.....	Albert Reinhardt, County Clk.
Ark., Little Rock	Nov. 1..	Building reinforced concrete bridge to cost about \$600,000.	Hedrick & Hedrick, Const. Engrs.
Ind., Rockport	2 p.m., Nov. 4..	Construction of bridge in Ohio township.....	A. B. Branch, Auditor.
Ind., Rockport	2 p.m., Nov. 4..	Construction of bridge in Ohio twp.....	A. B. Branch, Aud.
Tex., Belton	11 a.m., Nov. 7..	Construction of bridge.....	State Hwy. Dept., Austin, Tex.
MISCELLANEOUS.				
N. Y., Tompkinsville	Oct. 27..	Furnishing 4,300 galvanized iron elbows.....	Lighthouse Inspector, 3d Dist.
Tex., Santa Maria	2 p.m., Oct. 28..	Construction of 65,000 cu. yds., more or less, of canals, laterals and ditches and for construction of certain gates, pipe lines, bridges, etc.....	A. E. Anderson, Engineer, Brownsville, Tex.
Mass., South Boston	Oct. 28..	Furnishing and installing one large size and six smaller electrically driven capstans at capstan pits on dry dock.	F. W. Hodgdon, Engr.
Cal., Lindsay	Oct. 28..	Completing system of irrigation.....	E. G. Natzke, Secy., Irrig. Dist.
N. Y., Buffalo	11 a.m., Oct. 28..	Dredging and rock excavation in Block Rock channel, Buffalo	U. S. Engr. Office, Buffalo.
Cal., San Diego	Oct. 28..	Completion of hangar and salt water system (Spec. No. 3473)	Bureau of Yds. & Docks, Navy Dept., Washington, D. C.
Ill., Chicago	11 a.m., Oct. 28..	Delivering approximately 10,000 pounds red scrap brass..	Frank I. Bennett, Comr. of Public Works.
W. Va., Charleston	Oct. 28..	Installing electric traveling crane in foundry and forge shop (spec. 3436).....	Bureau of Yards & Docks, Navy Dept., Wash., D. C.
O., Palmyra	noon, Oct. 29..	Unloading coal machine.....	S. A. Haskell, Dir.
Minn., Windom	2 p.m., Oct. 29..	Construction of county ditches, involving 8 to 16-in. tile and retaining walls.....	S. A. Brown, Co. Aud.
Tenn., Memphis	11 a.m., Oct. 31..	Constructing about 175,000 cu. yds. of earth work.....	Mississippi River Com., Custom House, Memphis, Tenn.
Neb., Mitchell	2 p.m., Nov. 2..	Construction of 13.1 miles of main canal, involving 550,290 cu. yds. excavation.....	U. S. Reclamation Service, Washington, D. C.
Neb., Mitchell	2 p.m., Nov. 2..	Construction of 13.1 miles of main canal, involving about 550,290 cu. yds. of excavation.....	U. S. Reclamation Service, Washington, D. C.
B. C., Steveston	noon, Nov. 5..	Construction of protective works to existing jetty.....	R. C. Desrochers, Sec., Dept. of Pub. Wks., Ottawa.
N. Y., Albany	noon, Nov. 6..	Construction of stream gauging stations and barge canal terminals	W. W. Wotherspoon, Supt. Pub. Wks., Capitol, Albany.
Ky., Morganfield	1 p.m., Nov. 9..	Construction of ditch involving about 400,000 cu. yds. earth excavation	Norman R. Orcutt, Chief Engr.
Va., Bristol	4 p.m., Nov. 11..	Cleaning out channel and bed of creek, removing approximately 3,000 cu. yds. of material.....	C. F. Slate, City Auditor.
W. Va., Wheeling	11 a.m., Nov. 11..	Constructing pass, weir, beartrap, etc., for dam No. 23, Ohio River	U. S. Engineer Office, Wheeling, W. Va.
Porto Rico, Miramar	10 a.m., Nov. 25..	Construction and installation of a garbage and refuse incinerator plant	R. H. Tood, Mayor, San Juan, P. R.

ROADS AND STREETS

Suffield, Conn.—\$27,000, to build roads; \$15,000, for waterbound macadam; \$8,000, granite block, and \$4,000, for concrete, appropriated by the town.

Thompsonville, Conn.—To build roads and bridges this town appropriated \$35,000.

Washington, D. C.—Congressman Hawley has been urging that the construction of the unit of the Pacific highway lying between Canyonville and Galesville in Douglas county, Ore., be authorized. This has been done and the award of the contract for its construction is pending. Modifications in the original plans have been made involving principally the elimination of some 12 tons of steel, and bidders will be asked to submit new estimates on the modifications.

Summerville, Ga.—Board of commissioners of Chatham county considering grading, draining and surfacing with chert of 13 miles of road at cost of \$48,000.

Sioux City, Ia.—Resolutions levying and assessing for permanent sidewalks and in front of certain lands and lots in Rustin, Holman, Crescent Park, Edgewater and Pierce additions and in Hornick, Edgewater, Lovell and Grannis additions were adopted by the city council.

Chicago, Ill.—For improvement of South State St. from Van Buren to Polk Sts., South State St. improvement association had plans prepared. Work involves widening State St. at 12th St. crossover, building of ramp to connect 12th St. with State St., and widening Polk St. from State to Halsted St. Holabird & Roche, 104 South Michigan Ave., architects.

Great Lakes, Ill.—No bids received for grading here. By C. W. Parks, chief bureau of yards and docks, navy department, Washington, D. C.

Jeffersonville, Ind.—Commissioners of Clark county let contract in November for the construction of a macadam road in Washington township. Geo. W. Stoner, county auditor.

Lawrenceburg, Ind.—For the construction of a gravel road in Lawrenceburg township commissioners of Dearborn county receiving bids in November. Harry E. Lutherbeck, county auditor.

Des Moines, Ia.—Board of supervisors of Polk county receiving bids for the construction of one mile of gravel road between Valley Junction and Commerce.

Lebanon, Ind.—Bids received Oct. 23, 1918 at 10 a. m. by treasurer of Boone county for sale \$18,500 highway improvement bonds 4½ per cent, 10 years. J. L. Thomas treasurer.

Winnesboro, La.—Construction of about 10.5 miles of Winnesboro-Vidalia highway, Wards 1 and 2, Franklin Parish, 24 ft. crown, 14 ft. sand clay gravel, metal surfacing, to cost about \$102,400, considered by state highway dept.

Baltimore, Md.—For furnishing all materials and constructing approach to City Spring at head of Spring alley and St. Paul St., no contract was awarded Sept. 25 by dept. of public improvements.

Fall River, Mass.—City plans improvements in Main, William and Washington Sts.

Holyoke, Mass.—Board of public works authorized the paving of north side of Sargeant St. from Beech to Northampton Sts.; also will repair High St. from Hampden to Lyman Sts.

New Bedford, Mass.—Highway bonds to the amount \$69,439.50 have been awarded to Harris, Forbes & Co., of Boston. C. R. Hathaway, city treasurer.

Somerville, Mass.—Boston Elevated Railway Co., room 909, 101 Milk St., Boston, rejected bids for removing paving, North Somerville, near Tell Sq.

Detroit, Mich.—Contract shortly let by dept. pub. works for grading, paving and curbing 1,750 ft. Philadelphia Ave. from Cameron Ave. to Detroit, Grand Haven & Michigan Rys., asphaltic concrete on 6-in. concrete base, about \$20,000. Work involves 4,611 sq. yd. asphaltic concrete, 6-in. concrete base, 2,935 ft. straight and 107 ft. circular Berea or Medina curbing, 86.7 cu. yd. concrete under and behind curb and 217 lin. ft. retaining stone.

Duluth, Minn.—Owners of property on 34th St., between Lake Ave. S. and

Minnesota Ave., have petitioned the city commissioners to reduce the width of 34th St. from sixty to forty feet.

Decatur, Miss.—Roads will be built in Newton county by the state sand clay. Xavier A. Kramer, engr., Magnolia, Miss.

Tunica, Miss.—The State will construct a sand clay road with gravel surface in Tunica county. Xavier A. Kramer, engr., Magnolia, Miss.

Conrad, Mont.—City has authorized the issuance \$4,000 sidewalk bonds. John R. Hogg, city clerk.

New Brunswick, N. J.—City commission received a petition from property owners on Sandford St., between French St. and Jersey Ave., asking that a grade be established on that thoroughfare, and that the street be regulated, graded and curbed. Mayor Farrington.

New Brunswick, N. J.—City commission asked by the Wright Martin Aircraft Corporation to arrange for paving Codwise Ave., between Handy St. and Mile Run Brook, with brick or some other suitable pavement and has offered to finance the city on temporary loans to carry on the work. Mayor Farrington.

Canandaigua, N. Y.—W. I. Jones, of Rushville, was the successful bidder for an issue \$15,000 highway improvement bonds, Ontario county. Peter R. Cole, county treasurer.

Manhasset, L. I.—Taxpayers of Bayview Ave., Port Washington, submitted a petition to the town board, asking that a proposition to appropriate \$30,000 for the improvement of that highway be submitted to the voters at the coming election.

New Rochelle, N. Y.—The capital issues committee has passed favorably on the issuance of the following bonds: High school addition, \$37,500; to cover construction certificates issued prior to July 19, 1918, \$32,680.47; Main St. repaving, \$10,000; street drainage, \$4,850; Weaver St. repaving, \$4,300; city yard improvement, \$2,000. City Comptroller Harry A. Archibald.

Charlotte, N. C.—An ordinance was enacted by the city commissioners which establishes a permanent improvement district on South Tryon St., between 3d and Morehead Sts. Other ordinances establish Tryon St., between 3d and 6th Sts., and Trade St., between Mint and College Sts., as permanent improvement districts. Hearing on objections will be heard Nov. 7. Mayor McNinch.

Charlotte, N. C.—The city government was officially notified through the federal fuel administration that the request of the city for asphalt sufficient to resurface the streets in the business section had been allowed. Mayor McNinch.

Alliance, O.—City Auditor Chas. O. Silver receiving bids Nov. 4 for the following bonds: city portion improvement, \$11,500; water works extension, \$11,000.

Cincinnati, O.—The county engineer, William Beoh, has been asked to improve the Dayton pike, from Sharonville to the Butler county line, by covering the road with tar and pebbles. The commissioners of Hamilton and Butler county have agreed to share equally in the cost of repaving Howard road and the Edgewood school road, both near the county line.

Cuyahoga Falls, O.—Plans are being drawn for three miles of flagstone or concrete sidewalks. C. W. McKahan, engineer, City Hall.

Fostoria, O.—Council has authorized preliminary legislation for the paving of Sandusky St. City Engineer Latstraw will prepare the plans at once; \$20,000.

Springfield, O.—Street improvement bonds, \$46,602, sold by the city Oct. 14 to the Ohio National Bank of Columbus. W. J. Barrett, city auditor.

Urbana, O.—The state fire marshal requests that West Church St. be opened west as far as Russell St.

Warren, O.—The council has taken the initial steps looking to the project of a short-line highway to Cleveland. The road probably would have to come under government plans and would at least be 20 feet wide. The city's part of the work would be paving and sewerage about three-fourths of a mile on Parkman St. The council has authorized the widening of East Market St. by six feet.

Erie, Pa.—The Capital Issues Committee has passed favorably on the issuance of street improvement bonds to the amount of \$110,000.

Greensburg, Pa.—Comrs. of Westmoreland county rejected only bid received for building the Webster-Pittsburgh-Uniontown pipe road.

Greensburg, Pa.—No bids received for the building of Fort Robertson school house road by commissioners of Westmoreland county.

Columbia, S. C.—City may pave three thoroughfares to Camp Jackson. City engineer.

Jacksboro, Tenn.—Campbell county commissioners lets contract soon for macadamizing about 13 miles of Pike road between Jellico and LaFollette.

Kingsport, Tenn.—Davies Bertram Co., of Cincinnati, recently purchased an issue of street improvement bonds; \$90,000. Wm. R. Pouder, city clerk.

Brownsville, Tex.—Cameron county, Oct. 8, voted in favor of issuing \$350,000 road bonds.

Brownsville, Tex.—Ordinance passed by city council for the issuance \$100,000 street improvement bonds.

De Leon, Tex.—Movement under way for road to Duke Oil Field; estimate, \$50,000.

Eastland, Tex.—\$75,000 bonds voted by Rising Star Dist., Eastland county, to improve Cisco-Brownwood Highway.

Fort Worth, Tex.—It is planned to expend about \$35,000 for repairing pavements.

Roby, Tex.—\$60,000 bonds voted in Road Dist. No. 3 of Fisher county. M. A. Hopson, county judge.

San Antonio, Tex.—City has postponed the election until after the war to vote on the following bonds: Street and fire department, \$500,000; bridge, \$150,000; sewer, \$35,000.

Weatherford, Tex.—Parker county voted in favor of the proposition to issue \$400,000 road bonds.

Hampton Roads, Va.—Bureau yards and docks, navy department, Washington, D. C., plans to build roads and walks; specification 3451; about \$200,000.

Lynchburg, Va.—Interests in Amherst county which have use for the old river road from the Williams viaduct up the river are endeavoring to induce the board of supervisors of Amherst county to improve the thoroughfare before it is again thrown open to travel. The road has been out of commission since the work was started on the Amherst approach to the new viaduct.

Walla Walla, Wash.—Walla Walla county and the municipalities in the county plan to spend \$212,000 in the construction and maintenance of roads, bridges, streets and highways, according to information gathered by County Engineer G. C. Cookerly, at the request of the federal war industries board. It is estimated that the work will require 13,436 days' labor. A large proportion is essential maintenance work, and some of the bridges and all of the sidewalks will be new work. Sidewalks, it is estimated, will cover 6 miles, all in Walla Walla.

Listowel, Ont.—The town council has passed a resolution to pave the main street. Mr. McIntyre, care Ontario Railway and Municipal Board.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Santa Ana, Cal.—*J. G. Donovan, Los Angeles, at \$25,498, for building 5.47 mi. road in Yorba-Linda subdivision, involving 40,000 cu. yd. excavation. Board of supervisors, Orange county.

Denver, Colo.—*E. O'Neill, Sedalia, about \$76,375, for grading and draining 21 mi. ditch and crown work and 21 mi. shale surfacing from Rifle to Meeker road, Garfield and Rio Blanco counties. State highway commission.

Frostproof, Fla.—*Phil Lavy, Zolfo, Fla., by board of county commissioners, to construct road between Frostproof and DeSoto county line; sand clay, \$18,613.

Tampa, Fla.—J. L. Cone only bidder for shell surfacing on road between Wimauma and Manatee county. Comrs. of Hillsborough county.

Boston, Mass.—*Warren Bros. Co., 142 Berkeley St., about \$68,808, for paving East Broadway from Dorchester to L St., South Boston Dist., involving 150 lin. ft. circular edgestones set, 4,230 lin. ft. edgestones, reset, 120 sq. yd. granite block relaid with gravel joints, 1,920 sq. yd. granite block relaid with grout joints (dummy and brows), 56 sq. yd. granite block relaid with grout joint edgings, 11,040 sq. yd. bitulithic, 100 sq. yd. brick sidewalk relaid, 67,000 sq. ft. artificial

stone sidewalks and 840 sq. ft. artificial stone driveways. Dept. pub. Works.

Boston, Mass.—J. J. Quinn, 816 Old South Bldg., \$43,544; Coleman Bros., 1 Pearl St., Chelsea, \$43,695; V. Grande, \$46,777, low bidders Oct. 8 for paving Levetett St. from Green to Charles Sts., involving 550 lin. ft. edgestones, hauled and set, 140 lin. ft. circular set edgestones, 2,390 lin. ft. edgestones reset, 880 cu. yd. concrete base, 20 sq. yd. granite block relaid with gravel joints, 900 sq. yd. granite block furnished and laid with asphalt joints, 10 sq. yd. asphalt joints relaid, 4,380 sq. yd. grout joints furnished and laid, 20 sq. yd. grout joints relaid, 100 sq. yd. brick sidewalks relaid and 17,120 sq. ft. artificial stone sidewalk. Dept. pub. works.

Boston, Mass.—Coleman Bros., 1 Pearl St., Chelsea, \$45,340, only bidders paving Causeway St. from Beverly to Leverett Sts., involving 150 lin. ft. edgestones hauled and set, 1,010 cu. yd. concrete base, 6,070 sq. yd. grout joints furnished and laid, 150 sq. yd. grout joints relaid, 50 sq. yd. brick sidewalk relaid and 8,100 sq. ft. artificial stone sidewalk. Dept. pub. Works.

Boston, Mass.—J. W. Hahn, for supplying 80,000 vitrified paving blocks to the public works department.

Detroit, Mich.—Otis Cement Constr. Co., Hammond Bldg., building driveways and walks at Municipal Hospital, Boulevard and Blaine Ave., at \$5,000. Board of health. Jno. F. McKinley, secretary, 233 St. Antoine St.

Grosse Pointe, Mich.—Lennane Bros., 809 Union Trust Bldg., Detroit, about \$100,000 for resurfacing 7,000 ft. Jefferson Ave., east of city limits of Detroit, with creosoted wood block, involving 24,050 sq. yd. wood block.

Clarendon, Mo.—R. Brittenun, Brinkley, for grading 14 miles of road in Monroe county.

Independence, Mo.—Kansas Construction Co., care M. Rose, Armour Blvd. and Locust St., this city, for grading the Courtney Atherton road, involving 103,000 yds. earth excav. and 10,000 yds. rock excav., at \$47,479.

Trenton, N. J.—Weldon Contracting Co., Rahway, N. J., for highway improvements, Route 5, involving approximately 48,880 sq. yds. in Morris county, and *Wm. P. McDonald Const. Co., Mt. Vernon, N. J., for Route No. 14, involving about 48,580 sq. yds. concrete surface, in Cape May county.

New York, N. Y.—C. Helbeck, 633 Wales Ave., for paving roadway of Marginal St. (East River) from Peck Slip to Dover St. (East River), second-hand granite block pavement. F. L. Dowling, pres. Manhattan Boro.

Oak Harbor, O.—Burman and Weis, Elmore, O., for paving Ottawa St. with concrete. City council. Geo. Champe, engineer, Nasby Bldg., Toledo, O.

North Clairton, Pa.—Peter Cassidy, 7 Frampton Ave., Pittsburgh, Pa., at \$5,517, for grading sidewalks, curbing and gutters in State St., North Clairton. R. M. McKinney, engineer, North Clairton. Boro. council.

Amarillo, Tex.—J. C. Jones, Truscott, Tex., by Potter county commissioners, for road construction here.

San Marcos, Tex.—H. K. McCollum, Fort Worth, for road improvement in Hays county.

Bellingham, Wash.—Riddle & Hawkins at \$16,737.50, only bidder for concrete paving on Dock St. Bd. public works.

Franklin, Wis.—Thos. Dolan, Maple Grove, Wis., for three-quarter mi. road grading and surfacing in Franklin.

Milwaukee, Wis.—Manger & McGucken, 332 Layton Bldg., this city, for improving 6th St. from south line of Grand Ave. to the 6th St. viaduct, at \$5,407.

Verdun, Que.—M. J. Stack Paving & Contracting Co., Ltd., 167 McCord St., Montreal, has the general contract for pavements costing \$7,500.

SEWERAGE AND SANITATION

Manteca, Cal.—City trustees considers building a sewerage system, including an outfall and disposal plant, cost approximately \$42,000.

Creston, Ia.—Howard Miller, City clerk, receiving bids for sewer improvements; about 1,000 lin. ft. 8-in. sewer. T. S. Deloy, engineer.

Lava Hot Springs, Ida.—City council has passed an ordinance authorizing the issuance of sewer district No. 1 assessment bonds, \$14,854.23.

Clinton, Ia.—City council passed resolution for the construction of sewer in alley between 8th and 9th Sts., in Lyons, from Arnold to Illinois.

Granite City, Ill.—City will readvertise installing sewer Lincoln Pl., \$11,000. Edmund Hall, engineer.

Kansas City, Kan.—Kaw valley drainage district considers calling an election to drain and improve Kansas river; \$1,000,000. J. W. Silvers, secretary.

Marion, Kan.—Cottonwood valley drainage district voted \$300,000 in bonds, drainage work. Engrs., Tuttle-Ayres-Woodward Engr. Co., 307 Reliance Bldg., Kansas City, Mo.

Salina, Kans.—A sewer between Beloit and Minneapolis Aves., from Santa Fe 400 ft. west will probably be built. Mayor Mathews.

Akron, O.—Plans are being drawn by engineer, E. A. Zeisloft, Delaware Bldg., for a sewer in Amelia Ave., from Burton Ave. to Noble St. No date for bidders.

Elyria, O.—Council issued bonds for improvements as follows: West Broad St. sewer, \$336; Harwood and Dilworth Ave. sewer, \$2,023.91; West Broad St. sewer, \$1,565.28; Filbert St. sewer, \$1,385; West Ave. pavement, \$3,199.95.

Coshocton, O.—S. Bowen, clerk of the council, is shortly to invite bids for the construction of a storm sewer in Cambridge and Vine Sts. Estimated cost, \$4,300.

Warren, O.—City has sold to the State Industrial Commission the following bonds: Sub. Dist. No. 2 sewers \$19,000; Sub. Dist. No. 2 sewer assessment, \$70,000; Sub. Dist. No. 1 sewer, \$4,000; Sub. Dist. No. 1 sewer assessment, \$14,000. Geo. F. Hecklinger, city auditor.

Youngstown, O.—Pending the construction of a district sewer to carry the waste from the industrial plants and towns along the Mahoning River in Trumbull and Mahoning counties, proposed by the state board of health as a measure to prevent the contamination of the river water, the city may take action to utilize the water of Mill Creek to supplement the supply from the river and Milton lake for local use.

Oregon City, Ore.—Council petitioned by residents of Washington St., between 14th and 17th Sts., for the establishment of a sewer district and the construction of the sewer.

Altoona, Pa.—City received no bids for sewers in 12th alley, between 22d and 34th St. Jos. Shields, city engineer, Altoona.

Beaver, Pa.—The sewer committee and borough engineer were directed to prepare plans and secure bids for the laying of an 18-in. storm sewer, 400 ft. long, in First Ave., requested by the Standard Gauge Steel Co.

San Antonio, Tex.—See "Streets and Roads."

Tacoma, Wash.—The commissioner of public works is asking for bids on construction of an 8-in. sanitary sewer in the alley between E. F St. and E. G St., from S. 36th St. to Columbia Ave.

Reedsburg, Wis.—City has sold sewer bonds to the amount \$23,000. A. F. Niehuhr, city clerk.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Portland, Me.—*Aceto & Donatello, rear 76 Anderson St., for sewers. Board of public works. Edw. M. Hunt, commissioner.

Ironton, Minn.—*Pastoret Constr. Co., Lyceum Bldg., Duluth, for building sewers in district No. 2; about \$29,000. Work involves 1,130 ft. 12-in., 2,305 ft. 10-in. and 540 ft. 8-in. sewer, 12 manholes and 11 lampholes. City council.

St. Paul, Minn.—Feyen Construction Co., at \$499, bidder sewer Doswell Ave., near Keston St. City Purchasing Agt. H. W. Austin, city hall.

Elizabeth, N. J.—*Louis Jacques Constr. Co., 608 Montgomery Ave., for pipe sewers. Commissioners of Linden twp. Jacob L. Bauer, engineer, 120 Broad St.

Plainfield, N. J.—*Michael Mango, 320 Richmond St., at \$2,733.70, for sewers in Clinton Pl. and Rose St. City council. John J. Carroll, city clerk, 151 North Ave.

Camp Upton, L. I. (N. Y.).—*Beaver Engrg. and Constr. Co., 51 Chambers St.,

New York City, building sewage disposal plant at Camp Upton. U. S. Govt. Adv. Engr. F. M. Gunby.

New York, N. Y.—N. Dimenna, 618 Fordham road, \$18,100; Michael Del Balso, 746 East 179th St., \$18,982; G. E. Connolly, 355 Rivington St., \$19,475, bidders, Oct. 15, for building sewer and appurtenances in Scholled St., between proposed bulkhead line in Long Island Sound and City Island Ave. H. Bruckner, president, Boro. Bronx.

Staten Island, N. Y.—J. Johnson Sons, West New Brighton, \$38,813, for building sanitary sewer with iron pipe outlet, in Richmond terrace, from Western Ave. to point 170 ft. east of Holland Ave. C. D. Van Name, president, Richmond Boro.

Yonkers, N. Y.—F. A. Cianfageione, 129 Oak St., at \$10,500, building house and store sewers, McLean Ave., Yonkers. Bd. of contract and supply.

Ontario, Ore.—Chas. K. Helmer, for the construction of the East Side sewerage system, \$30,000. City council.

Fond Du Lac, Wis.—August Krueger, for the construction of a sanitary sewer on East Sibly St. from Marquette St. westerly for a distance of 40 ft., at 79 cts. per ft. for the piping and \$68 for each manhole; 8-in. piping to be used.

WATER SUPPLY

Gadsden, Ala.—Waterworks pumping station will be equipped by the city for electrical operation; three pumps with motors and other equipment will be installed.

Sacramento, Cal.—For furnishing plans and installing complete and ready for service a single-stage, double suction, horizontal shaft types, centrifugal pumping unit, including all connections. All bids were rejected Oct. 1, by city commission.

Blackfoot, Ida.—An ordinance is before the city council providing for an election to vote on issuing \$95,000 water bonds.

Le Roy, Ill.—John Nuveen & Co., of Chicago, purchased water improvement bonds, \$15,000, authorized at the election Aug. 10. C. E. Dawson, city clerk.

Clarinda, Ia.—For extensions and improvements to water works city plans to vote on \$75,000 bond issue. I. H. Taggart, mayor.

Fort Scott, Kan.—Engrs. Black & Veatch, 507 Interstate Bldg., Kansas City, Mo., drawing plans waterworks improvements; bids about Nov. 1; \$155,000.

Lynn, Mass.—Members of the municipal council are looking into the plan for the purchase of pumps for the water department. Supt. Newsom.

Port Huron, Mich.—The Harris Trust & Savings Bank of Chicago was the successful bidder for an issue water bonds, \$55,000. Geo. L. Ernst, commissioner of finance.

University, Miss.—University of Mississippi will have well sunk; 350 ft. deep, 8-in. tubing; bids are being received. Address University of Mississippi, Box A, University, Miss.

Fayette, Mo.—Powell, Garard & Co., of Chicago, recently purchased an issue water works bonds, \$10,000.

Greeley, Neb.—City voted for water works improvements \$10,000 bonds.

Osceola, Neb.—The proposition to issue \$10,000 water extension bonds was defeated at the election Oct. 1. W. E. Snider, city clerk.

Plainfield, N. J.—For a covered reservoir with 20,000,000 gal. capacity, plans are being prepared for the Plainfield Union Water Co. R. S. Sherred, City Hall, Newark, engr.

Akron, O.—City Auditor Thos. S. Hefernan receiving bids, Nov. 7, waterworks extension bonds, \$1,315,000.

Alliance, O.—See "Streets and Roads."

Canton, O.—This city will be ready for bids soon for sanitary sewers in various streets to cost a total of \$140,000; approximately 3 miles vitrified pipe. Frank De Creps, director of public service, W. E. Sarver, city engineer, both city hall.

Stubenville, O.—The attention of the city council has been called to the fact that the booster pump motors at the filtration plant were too small to perform their proper functions and that new and

more powerful motors would have to be provided if a proper water supply was to be maintained for the hilltop and West Market St. section.

Loveland, Okla.—This town has sold an issue waterworks bonds, \$3,000, to R. J. Edwards, of Oklahoma. Mike Fry, town clerk.

Stillwater, Okla.—Contract for building boiler room, engine room and filter plant, brick, shortly let by city, about \$175,000. J. L. Moore, clk.

Sulphur, Okla.—City is drilling a new well. H. B. Webster, mayor.

Lemoine, Pa.—Riverton Consolidated Constr. Co., C. H. Bishop, Lemoine, having plans drawn, water system. Engrs., Gannett, Seelye & Fleming, Harrisburg, Pa.

Mineral Wells, Tex.—City will sell at once \$100,000 water improvement warrant. Mayor L. E. Cowling.

Seattle, Wash.—Plans and estimates for water mains, E. 80th St., et al., 4,850 ft. 8-in. wood pipe required and 1,050 ft. of 16-in. cast iron pipe. Approximate cost, \$23,000.

Seattle, Wash.—An appropriation of \$65,000 for the construction of a steel water reservoir in W. Seattle was authorized by the city council.

Tacoma, Wash.—The council has passed resolutions providing for a 6-in. wooden water main on S. 49th St., from McKinley Ave. to E. I St.

Oregon, Wis.—Water extension bonds to the amount of \$3,000 sold by the village to the Bank of Orgeon. C. A. Hanan, clerk.

Lakefield, Ont.—The town council of Lakefield are contemplating the construction of water mains.

Sorel, Que.—Water extension bonds to the amount \$75,000 was sold to Versailles, Vidraire & Boulais, of Montreal.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Claremont, Cal.—A. Johnson, Ontario, Cal., for constructing a concrete reservoir for the Claremont School for Boys; a capacity of 10,000 gallons. A reinforced concrete plunge 25x60 ft. will be constructed later.

Grinnell, Ia.—C. W. Ennis, this city, for constructing a 1,000,000 gal. reinforced concrete reservoir, at \$16,800. *Thorpe Bros., Good Bldg., Des Moines, Ia., for digging the well connected with this project.

La Crosse, Kan.—D. E. Dunn & Co., Wichita, Kan., for improvements to waterworks here. City council. W. M. Newman, clerk.

Little Falls, Minn.—Siems, Helmers & Schaffner, St. Paul, Minn., by Little Falls Water Power Co., for construction of a concrete spillway for dam, at about \$80,000.

St. Joseph, Mo.—The *Missouri Valley & Iron Co., Leavenworth, Kan., for digging a well for Swift & Co. The well is to be 34 ft. in diameter, has a depth of 8 ft. and the interior will be lined with a two-chamber reinforced concrete caisson, separated by water-tight bulkheads. Total cost, about \$40,000.

Trenton, N. J.—H. E. Stahl, 275 Bellevue Ave., \$123,000, for installing one 25,000,000-gal. steam driven and one 20,000,000-gal. electrically driven centrifugal pumps, including one motor, one motor generator, appurtenances, etc., for Calhoun St. pumping station.

Akron, O.—Gessner Co., 616 Nicholas Bldg., Toledo, \$10,667; J. D. Kuhn, 333 North 8th St., Barberton, \$11,219; P. Agrois, Akron, \$11,714, bidders Oct. 1 for laying 11,100 lin. ft. 6 and 2,100 lin. ft. 8-in. c-i. pipe and setting 35 line hydrants, involving replacing of 200 sq. yd. paving, 15 cu. yd. concrete and brick masonry, 6,500 cu. yd. earth excav. and 180 cu. yd. rock excav. Contr. No. 109, G. P. Hoffman, dir. pub. serv.

Seattle, Wash.—Swensson & Co., Arcade Bldg., for the construction of the three 50,000-gallon wood water tanks with their supporting towers in West Seattle, \$7,222.50. Board of pub. works.

West Bend, Wis.—Siems, Helmers & Schaffner, St. Paul, Minn., by the West Bend Woolen Mills Co., for the construction of a dam, at \$25,000.

St. Lin, P. Q.—General Supply Co. of Canada, Ltd., Ottawa, Ont., for a Wallace & Tiernan chlorinator to sterilize the water supply. The equipment will be of the manual control solution feed type.

LIGHTING AND POWER

Louisville, Ky.—Louisville Gas & Electric Co. is said to be considering plans for extensions in its transmission system to Stithton, for the purpose of furnishing electric energy to the government station at that point.

Cumberland, Md.—Plans have been prepared by the Edison Electric Illuminating Co. for extensions in its electric system through Ridgedale to Cumberland.

Fair Haven, Mass.—In connection with the construction of a new local naval station base by the government, navy department, considerable new electrical equipment will be required. Plans for the work are now being made.

Canisteo, N. Y.—City plans to issue \$15,000 electric light plant bonds.

Pelham, N. Y.—Plans for the construction of a new addition to the brick power plant at the local naval training station has recently been completed by the United States Government, navy department. Charles Ewing, 101 Park Ave., New York, architect.

Mt. Airy, N. C.—City commissioners have plans under consideration for the construction of an electric power plant; cost, about \$50,000.

Nelsonville, O.—W. L. Slayton & Co., of Toledo, successful bidders, electric light improvement bonds, \$2,500. Wm. B. Gray, city auditor.

Savannah, O.—Village has sold Oct. 3 to the Farmers Bank of Savannah \$5,000 electric light bonds. John Gibson, clerk.

Holtwood, Pa.—It is reported the Susquehanna Transmission Co. has filed notice with the public service commission of a bond issue for \$32,000, to be used for extensions and improvements.

Plattsford, Pa.—Construction division, war department, Washington, D. C., plans to build gas plant near here; about \$2,000,000.

Sunbury, Pa.—Citizens will decide at November election the question of issuing \$225,000 bonds to purchase the Northumberland County Gas & Electric Co.'s plant.

Woonsocket, R. I.—Resolutions recommended by the lights committee providing for street lights at the corner of Mendon road and Newbury Ave., on Third Ave., between Rhodes Ave. and Walnut St., and the corner of Newland Ave. and Laval St., were adopted. Mayor Archambault.

Jellico, Tenn.—Citizens Oct. 12 defeated the proposition to issue \$20,000 electric light bonds. D. C. Moser, town rec.

Tacoma, Wash.—The city council may take up soon the development of a storage basin for the city hydro-electric plant at La Grande, as a result of its inspection of the plant and the site for an impounding basin above it on the Nisqually river; cost, approximately \$500,000. Commissioner H. F. Gronen, Engineer, Morton L. Taylor.

Usk, Wash.—Mountain State Power Co. have completed plans for the construction of a new transmission line from Usk to Chewelah, a distance of approximately twenty miles. The work is estimated to cost in the neighborhood of \$90,000.

Grande Prairie, Alta.—The town council has passed a bylaw authorizing the construction of an electrical plant.

Toronto, Ont.—The time for receiving tenders for the four 52,500 h.-p. turbines for the Chippawa-Queenston power development of Ontario Hydro-Electric Power Commission has been extended to Nov. 1.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Meadville, Pa.—*Keystone Constr. Co., for reflowing bridge over French creek; *Standard Engrg. Co., 2463 Broadway, Toledo, O., for reflowing bridge over French creek at Saegerstown, Pa. Commissioners, Crawford county. R. L. Phillip, county bridge engineer, Meadville.

Taylor, Pa.—Wm. J. Davis, N. Main St., building bridge in Oak St., over Keyser creek, at \$3,000. Boro. council. H. C. Hall, engineer, Mears Bldg., Scranton, Pa.

Chicoutimi, Que.—*William Hamilton Co., Ltd., of Peterborough, Ont., for one

single discharging, open penstock, horizontal water turbine of 75 h. p. at 400 r. p. m. under 34 ft. head. By Pitre Riverin.

Peterborough, Ont.—William Hamilton Co., Ltd., of Peterborough, for water turbine for their London St. power house. By the Quaker Oats Co.

FIRE

Delano, Cal.—Bids are desired on construction of fire station, brick, 24x36.

Hudson, O.—Stacy & Braun, of Toledo, successful bidders, fire department bonds, \$3,000. B. S. Sanford, village clerk.

Leetonia, O.—W. L. Slayton & Co., of Toledo, successful bidders for an issue fire department bonds, \$2,000. J. S. McCue, village clerk.

Middletown, Pa.—Motor equipment for three companies is to be purchased.

Sisseton, S. D.—The installation of a fire alarm system is contemplated.

San Antonio, Tex.—See "Streets and Roads."

Chilhowie, Va.—City will vote Oct. 29 on issuing \$10,000 fire department bonds. Ames D. Tate, mayor.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Charlotte, N. C.—*American Hardware & Equipment Co., of Charlotte, representing the Fabric Fire Hose Co., for one thousand feet of fire hose, and also the *United States Tire & Rubber Co., represented by C. V. Payne, for one thousand, described as "white" hose.

BRIDGES

Edmonton, Ala.—The C. N. R., Toronto, will build three steel bridges. Engineer, A. T. Fraser.

Chico, Cal.—A referendum petition will be presented to the Butte county board of supervisors by a committee of Chico, Durham, Gridley and Biggs business men, requesting that body to allow the voters of the county to decide at the November election whether the proposed \$200,000 Feather river bridge, connecting the Oroville lateral of the state highway is necessary war-time construction. The supervisors at their last meeting voted to advertise for bids for the bridge, and the referendum petitions quickly followed.

Placerville, Cal.—Residents of the Salmon Falls district, on the border of El Dorado and Sacramento counties, have filed a petition asking the supervisors to locate a foot bridge across the South Ford of the American River there, to enable children to pass safely to and from school. County Surveyor C. H. Wildman was instructed to investigate the matter and report at the November meeting.

Thompsonville, Conn.—See "Streets and Roads."

Silver City, Ida.—Owyhee county will vote Nov. 5 on issuing \$100,000 bridge bonds.

Cincinnati, O.—Board of Hamilton county commissioners for renewing floor on bridge No. 67 on E. Miami River road; No. 176, in Colerain township, lets contract Nov. 1. Albert Reinhardt, clerk.

Philadelphia, Pa.—A bill proposing the construction of a highway bridge across the Delaware River between Philadelphia and Camden, at a cost of \$16,000,000, half of which is to be borne by the Federal Government and the remainder by the States of Pennsylvania and New Jersey, was introduced in the House Oct. 15 by Representative William S. Vare of Philadelphia.

San Antonio, Tex.—See "Streets and Roads."

Walla Walla, Wash.—See "Streets and Roads."

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Clinton, Ia.—*Gabriel Lumber & Fuel Co., this city, for furnishing Clinton

county with 168,000 bd. ft. bridge plank 3x12x16 Douglas fir No. 1, at \$6,024.

Sullivan, Ind.—M. C. Lloyd & Son, for \$9,360, for the construction of a concrete bridge on the line between Sullivan and Vigo counties. The bridge will be located 10 miles west of Farmersburg.

Missoula, Mont.—Forseen & Settergreen, this city, for constructing a steel and concrete bridge over Rattlesnake creek at E. Pine St. for the Missoula St. Car Co.

Hackensack, N. J.—The *Dansen Construction Co. to repair the Forest Ave. culvert in Lyndhurst and other culverts in Bergen county.

Jersey City, N. J.—A. Lemon, 100 York St., this city, for repairing and painting bridge and viaduct for the Penn Ry. Co., at about \$32,700.

Stewartville, N. J.—J. C. Searlis, Belvidere, N. J., for constructing single-span concrete bridge from here to Bloomsburg, at \$12,000.

Albany, N. Y.—Lathrop, Shea & Herwood Co., of Buffalo, \$70,642.50; E. Brown Baker, of Herkimer, \$69,100, bidders for the construction of a plate girder bridge over the old Cayuga and Seneca canal at Geneva. State Superintendent of Public Works Witherspoon.

New York, N. Y.—Ruggles Robinson, 331 Madison Ave., about \$50,000, for building bridge on 42d St. to connect Grand Central Station with 4th Ave., let by New York Central R. R., Grand Central Station.

Sallina, Pa.—Farris Engineering Co., Empire Bldg., Pittsburgh, for repairing bridge over the Kiskiminetas river, at about \$13,000.

Martinton, W. Va.—*Duncian Const. Co., this city, for construction of two reinforced concrete arch bridges, Buck's Run arch and Swago Creek arch, at \$3,495.

New Martinsville, W. Va.—*Luten Bridge Co., Clarksburg, W. Va., for constructing concrete bridges over Fish creek and Carnegie pump station; and *Wetzel Engineering Co., New Martinsville, for constructing the two Diggins bridges over Big Fishing creek.

MISCELLANEOUS

Camp Kearney, Cal.—Constr. Div., War Dept., Wash., D. C., plans to build Liberty theatre here, about \$21,000.

Washington, D. C. (Bureau of Foreign and Domestic Commerce, Department of Commerce)—An agency is desired by a company in Chile for the sale of American manufactured goods in general, such as machinery, motor cars, and accessories, agricultural machinery, tractors, engines, electrical accessories. Correspondence may be in English. Reference. Refer to opportunity No. 27583.

Washington, D. C.—Otto M. Eidlitz, president of the United States Housing Corporation, will have charge of the

laying of the new trackage required for the operation of the proposed street railway belt. The plans have been approved by the district commissioners and the secretaries of war and navy. The new tracks will permit the cars of the Washington Railway and Electric Co. to use the Potomac Park loop of the Capital Traction Co.

Pensacola, Fla.—City budget ordinance providing for the expenditure of \$354,438.25 by the various branches of the city government during the fiscal year was passed by city commissioners: General fund, \$44,900; health department, \$16,780; police department, \$54,100; fire department, \$47,506.56; street department, \$66,520; sinking fund, \$84,050; waterworks, \$40,581.69.

Pensacola, Fla.—Bureau Yards and Docks, Navy Dept., Wash., D. C., receiving bids Oct. 28, building boatshed in West Basin (spec. 3472).

Des Moines, Ia.—Polk county has sold to the Bankers Mortgage Co., of Des Moines, an issue funding bonds, \$253,000. T. J. Alber, county auditor.

Huntington, Ind.—The national council of defense has approved the sale of bonds for the construction of the Little River ditch; the ditch will release thousands of acres in Huntington, Wells and Allen counties from floods which hindered the growth of the crops in the river lowlands. I. H. Heaston, commissioner.

Indianapolis, Ind.—The board of park commissioners has authorized James H. Lowry, superintendent of parks, to buy 50,000 gals. of tarvia and 4,000 gals. of road oil for application next year on the city's parkways and boulevards. The tarvia costs 13 cents a gallon and the other grade of oil costs 21 cents a gal.

Wichita, Kan.—City will remodel city hall; estimated cost \$14,000. L. W. Clapp, mayor.

Louisville, Ky.—Constr. Division, War Dept., Wash., D. C., plans to build school to consist of quarters, barracks, administration office, class room and motor school, about \$182,233.

Boston, Mass.—Bureau yards and docks, navy department, Washington, D. C., plans to install in boiler plant mechanical equipment and pipe; specification 3533; about \$200,000.

Lausling, Mich.—Plans for two comfort stations to be located under the sidewalks at the intersection of Washington Ave. and Michigan Ave. was submitted to the city by Alderman Britten; estimated cost, about \$3,000 each.

Wyandotte, Mich.—City commission has decided to purchase a combination police patrol and ambulance; cost, approximately \$2,100.

Camp Shelby, Miss.—National War Work Council, Y. M. C. A., will remodel administration building, repair garage building and erect service building; \$13,200. A. K. Adams, department supervisor of construction, Atlanta, Ga.

Newark, N. J.—Following the capital issues committee's approval of \$119,600 bonds for the erection of a tuberculosis hospital at the Essex Mountain Sana-

torium, Verona, the board of freeholders formally adopted resolutions which will start the work at once.

Johnstown, N. Y.—City receiving bids, Nov. 9, for an issue poor fund coupon or registered bonds, \$9,400. City Chamberlain W. J. Eldridge.

Charleston, S. C.—War department will erect barracks and quarters at Sullivan Island, \$4,000. F. B. Wheaton, architect, 7th and B Sts., Washington.

Stony Creek, N. Y.—Almon Swears, of Stony Creek, has purchased stone crusher and steam roller bonds to the amount of \$3,000, offered on May 15. Arthur E. Adams, supervisor.

Miramar, Porto Rico.—For the construction and installation of a garbage and refuse incinerator plant at Miramar, P. H. Todd, of San Juan, P. R., receiving bids in November.

Calgary, Alta.—It has been decided to build an electric railway. The route will cross the city limits at Fiftieth Ave. W., and after a slight slant will cross the prairies in an almost direct line to the new hospital site.

New Westminster, B. C.—The town council contemplates the erection of a city market building and cold storage plant. Market Clerk D. E. MacKenzie.

Bridgewater, N. B.—The erection of a hospital, costing \$50,000, for the town and municipality is under contemplation.

Montreal, Que.—The construction of a subway under the C. P. R. tracks at Masson St. is contemplated by the city council.

Moose Jaw, Sask.—The city council has passed a resolution recommending the company to build an electric railway line from 4th Ave. S. W. and Coteau St., west to 9th Ave. S. W., thence north on 2d Ave. to Lillooet St., and thence along Lillooet St. to 4th Ave.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

San Diego, Cal.—*Harris & Stevens, San Diego, for building five hospital wards at naval training station, at \$12,660. By San Diego navy yard.

Groton, Conn.—*National Eng. Co., 40 Central St., Boston, Mass., about \$1,200,000, for building brick houses for workmen, by Groton Iron Works and U. S. Shipping Board Emergency Fleet Corp., 253 North Broad St., Phila., Pa.

Indianapolis, Ind.—*White Motor Co., of Cleveland, O., for supplying the city with four 5-ton trucks and 24 trailers, to be used in the collection of ashes; cost, \$57,500. Dwight S. Ritter, city purchasing agent board of public works.

Bar Harbor, Me.—*E. K. Whitaker, 122 Cottage St., at \$78,252, for housing facilities and fence. Bureau Yards and Docks, Navy Dept., Wash., D. C.

Boston, Mass.—*B. E. Grant, for track work on Commercial St., between Hanover St. and Kearney Sq., by the trustees of the Boston Elevated Railway Co.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
Ky.	Nelsonville	Oct. 26.	Improvement of a number of county roads.	John H. Salmon, Co. Clk.
Wash.	Ephrata	2 p.m., Oct. 28.	Construction of 2 mi. of permanent highway.	Co. Engr., Grant Co., Wash.
O.	Minerva	Oct. 30.	Improvement of road.	Co. Surv.
Ga.	Macon	10 a.m., Nov. 4.	Construction of two concrete gutters.	J. Boss Bowdre, Clk., Bd. of Comrs., Bibb Co.
SEWERAGE.				
Wis.	Milwaukee	10.30 a.m., Oct. 26.	Construction of reinforced concrete and vitrified pipe sewers, ranging from 8 to 36-in., including manholes and necessary connections.	Percy Braman, Comr. of Pub. Works.
MISCELLANEOUS.				
Wis.	Fond du Lac	Oct. 28.	Construction of township ditch.	J. B. Doolan, Town Clk.
Neb.	Mitchell	2 p.m., Nov. 2.	Construction of 13 mi. of main canal, involving 550,290 cu. yds. of excavation.	U. S. Reclamation Serv., Washington, D. C.
W. Va.	Wheeling	Nov. 11.	Construction of dam across Ohio river, and of pass, weir, beartraps, etc., for existing dam.	Gov. Engr.

STREETS AND ROADS.

Wichita, Kan.—Board of commissioners adopted resolutions to construct curb and gutter on Murdock Ave., from the west line of Buffum Ave. to east line of Amidon Ave.; also on Amidon Ave., from the north line of Murdock to the south line of Beal Ave. L. W. Clapp, mayor.

Battle Creek, Mich.—That an effort will be made by Calhoun county to secure both federal and state aid in building the pavement between Marshall and Battle Creek is indicated in the report of the county road commissioners to the board of supervisors. It is not proposed to construct this road until 1920, but it will be necessary to authorize the sale of \$100,000 bonds at this time in order to get the details and preliminary work completed. The commissioners also recommend the sale of \$45,000 worth of bonds to complete roads under construction and to construct three miles of road beginning in Ceresco and running south one mile and west two miles to connect with the new south Emmett road, and for an appropriation of \$5,000 for maintenance and repair of county roads. The commissioners also ask that \$100,000 of county road bonds be sold for the construction of county roads and bridges during the coming year. The work mapped out which will be done unless the present high wages and the shortage of labor continues is as follows: Duck Lake road, Marengo township, 5 miles, estimate cost, \$20,000; Burlington and Tekonsha road, 2½ miles, estimate cost, \$12,000; Partello road, Lee, 3¼ miles, estimate cost, \$16,255; Homer and Groverville road, Homer, 2 miles, estimate cost, \$8,000; Clarendon center road, Clarendon, 2½ miles, estimate cost, \$11,225; Ellis Corners road, Fredonia, 4 miles, estimate cost, \$20,000; Burlington and Ceresco road, Newton, 3 miles, estimate cost, \$12,000; Pierce road, Emmett and Marshall, 1 mile, estimate cost, \$5,000; Gorsline road, Pennfield, 3½ miles, estimate cost, \$16,000; St. Mary's Lake road, Pennfield and Bedford, 2.6 miles, estimate cost, \$13,000.

Ashland, O.—Bids are to be invited again for 4.08 miles of the Savannah-Vermillion road, from north of Savannah to Ruggles Center. By the state highway commissioners at Columbus.

Dayton, O.—City commission adopted resolution ordering cement curb and sidewalk constructed on south side of Dodgson Court, from Brandt St. to Lukaswitz St., and on Chapel Ct., from Troy St. to B. & O. R. R. J. M. Switzer, mayor.

Grants Pass, Ore.—Considerable road improvement work will be done in Josephine county this fall and winter. Judge Gillette, of the county court, states that the highway from the old sugar factory site to the Jackson county line will be graveled in spots where it is most needed, and that later, probably some time in January, the six-mile stretch of macadam road leading from the Rogue River bridge south will be ripped up and resurfaced.

Seattle, Wash.—No more roads will be built in this state this year according to announcement by State Highway Commissioner James Allen. "Roads cost 75 per cent. more than they did in 1915 and about 30 per cent. more than they did last year. Consequently the state has decided that it is a waste of the state's money to build any more roads with labor and material so high."

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Alton, Ill.—*C. H. Degenhardt, for paving Bell St. City council.

Chicago, Ill.—*White Paving Co., 17 N. La Salle St., Chicago, for Michigan Ave. improvement substructure of north approach at \$450,000. Board of local improvements. M. J. Flaherty, president, 207 City Hall.

Taunton, Mass.—*Jas. Reilly, 21 Presbrey Ave., for paving on Walker St. Com. on streets and bridges. J. William Flood, chairman.

Kansas City, Mo.—*Martin D. Bagwell, 415 Railway Exchange Bldg., for repairing 52d St., from Wornall to Holmes; 52d St., from 51st to Sunset Drive; 53d St., from Sunset Drive to Bellevue Ave.; 53d St., from Wornall to Brookside; 53d St. terrace, from Wornall to Brookside, all macadam paving.

MUNICIPAL AND CORPORATION BONDS PURCHASED

Correspondence invited from officers of Municipalities and from well-established industrial corporations contemplating new financing.

HORNBLOWER & WEEKS

INVESTMENT SECURITIES

42 BROADWAY, NEW YORK

Boston

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Portland, Me.

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Public improvements. Curtis Hill, city engineer. Frank E. McCabe, secretary, board of public works.

Kenney, N. J.—*Maher & McNichols, Passaic Ave., for paving Passaic Ave., between Lincoln highway and Pennsylvania Ave., at \$80,000. Town council. Wm. R. Ross, town clerk.

New York, N. Y.—O'Rourke Contr. Co., 150 Nassau St., for regulating, grading and repaving with granite block on concrete foundation, Seventh Ave., from Carmine St. to Greenwich Ave. Frank L. Dowling, president, borough Manhattan.

Southport, N. J.—*Holleran Brothers, for a brick pavement on South Main St., beginning at the city line and extending 625 feet south, all the town of Southport. Work will start at once.

Uniontown, Pa.—*McNeil Donald Co., Jenkins Arcade, Pittsburgh, Pa., for road resurfacing in Fairbanks road, extending from Fairbanks to Herbert Works, Redstone township. Board Fayette county commissioners. J. Gephart, engineer, Court House, Uniontown.

Meeme, Wis.—*Steven Kenechtel, Manitowoc, for grading and surfacing Green Bay road here; about \$20,000. Commissioners of highways of Manitowoc county.

SEWERAGE.

Clarksburg, W. Va.—The state board of control to authorities at Clarksburg, states the appropriation of \$45,000 for the building of a sewage disposal plant at the State Hospital will be expended for that purpose, and that the work of construction will be started in the early spring.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Mishawaka, Ind.—*Staples and Ackerman, South Bend, Ind., for sewers in Division St. City council. J. L. Stevens, engineer, City Hall, Mishawaka.

Davenport, Ia.—The Independent Construction was low bidder for installing sewer in the vicinity of Carey and South Aves., \$5,800.05, and in the neighborhood of Indian and Rockingham roads, through the Rohse and Martzahn additions, \$4,794.95. Board of public works.

Boston, Mass.—*Jos. Tedesca, Auburn St., Roslindale, at \$8,317, for sewerage works in Green St., West Roxbury district. Department of public works.

Kansas City, Mo.—*Empire Constr. Co., 419 Nelson Bldg., at \$2,027.90, for sewer in district 444, division 5. Board of public works.

New York, N. Y.—*Riley Constr. Co., 150 Nassau St., New York City, for repairs and alterations to outlet and barrel sewer at foot of Roosevelt St. and East River. Boro. of Manhattan.

Edgerton, Wis.—*Hain, Wick & Arthur, for 533 lin. ft. 8-in. sewers. City council. Reichardt & Pierce, engineers, Watertown, Wis.

Marinette, Wis.—*Sam Robinson, for sanitary sewers. City council. A. L. Gillis, city engineer.

WATER SUPPLY.

Cleveland, O.—*Robt. Hoffman, city engineer, has plans and bids will be opened soon for the installation of water mains in the following streets and avenues: Arowneac, Cherokee, Mohawk, Muskoka, Pawnee, Dunlap, Gay, Hol-

born, Watterson, East 123, 141 and 142, Behrwald, Wichita and W. 9, for City.

Columbus, O.—Plans will soon be prepared by Engr. John H. Gregory, 170 Broadway, N. Y., for storage dam improvements to be constructed north of this city at an estimated cost of \$75,000. Geo. A. Borden is director of public service.

Zanesville, O.—The council has voted to ask aid from the state in auditing the validity of all contracts in regard to the new well water plant and to have a competent engineer from the state health department investigate the proficiency of the waterworks plant. Service Director M. K. Tracy states that the council and not the government will have to repair the levee on the Muskingum river, and an appropriation of \$1,500 for this purpose has been made. The paving of Sheridan St. was deferred until next year, on account of the high cost of materials. Temporary improvements will be made.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Rockaway, L. I. (N. Y.)—*Chas. Meads & Co., N. Y. City, at \$18,450, for extension to water and fire system at Rockaway. Bureau of yards and docks, C. W. Parks, chief, navy department, Washington, D. C.

LIGHTING AND POWER.

Granbury, Tex.—R. Grundy will rebuild light, power, ice and water plants reported burned at a loss of \$20,000.

Coulee City, Wash.—The local electric light plant was entirely destroyed by fire recently.

BRIDGES.

Auburn, Col.—The necessity of a Government permit for the construction of bridges and highways may delay construction work on two bridges on the Auburn-Grass Valley lateral of the state highway system until after the close of the war. The contract for the construction of these was awarded by the supervisors to C. A. Cooper, at an approximated cost of \$8,000.

Rockport, Ind.—Spencer county lets contract next month for building bridge in Ohio township. A. B. Branch, auditor.

Ebensburg, Pa.—Commissioners of Cambria county received no bids for strengthening highway bridge over Little Conemaugh river, at Mineral Point. S. E. Dickey Co., engineers, 809 Johnstown Trust Bldg., Johnstown, Pa.

MISCELLANEOUS.

Washington, D. C. (Bureau of Foreign and Domestic Commerce, Department of Commerce)—A firm in Italy wishes to represent American manufacturers of iron and steel products. Full particulars and references may be had on application to the New York agent of the firm's bankers. Refer to opportunity No. 27584.

Detroit, Mich.—The council committee on ways and means recommended the appropriation of \$1,000 for the dredging of Fox creek.

Elmira, N. Y.—Taxpayers defeated at an election, Oct. 15, the proposition to issue \$40,000 bonds for the erection of a garbage crematory. Mayor Hoffman.

Swissvale, Pa.—School district of the borough receiving bids, Nov. 6, for an issue \$48,000 school coupon bonds. Geo. L. Pyrie, secretary, Noble St.

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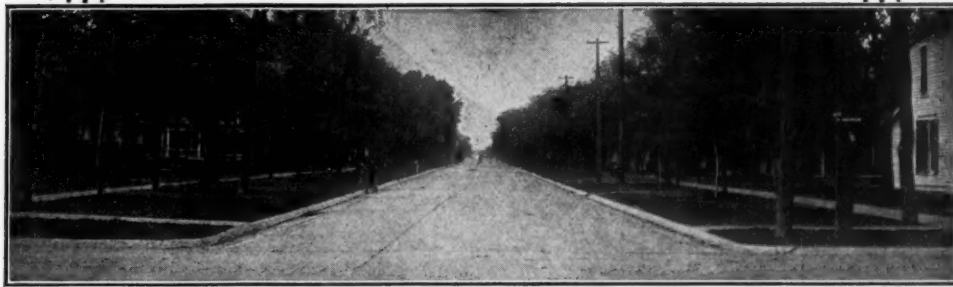
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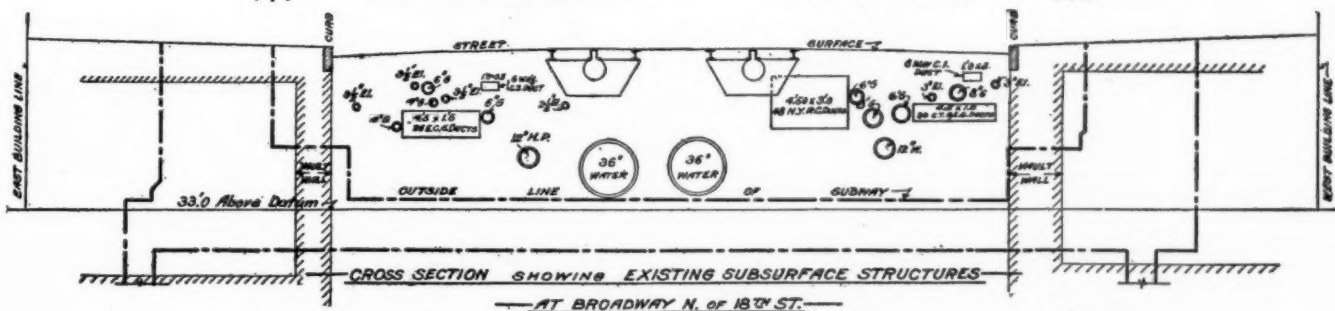
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Sealed Proposals

HAMILTON, OHIO

Sealed bids will be received by the Director of Public Service of the City of Hamilton, Ohio, at the office of the Director of Public Service of said City until 12:00 o'clock noon on the fourth day of November, 1918, for furnishing of pipes, valves, labor, machinery, equipment and material and performing all work necessary for the complete installation of a suction pipe line and connecting same to six wells, which are yet to be installed, and to the pumps now in use and located in the booster station belonging to said City.

The location of said work is in or near the well field from which said City is now pumping water.

Said material and work to be furnished and done in accordance with plans and specifications now on file with the Director of Public Service of said City of Hamilton, Ohio, for the improvement of the waterworks system of said City. The bids will be opened in public at 12:00 o'clock noon of the fourth day of November, 1918, and publicly read, after which they will be considered and the award made as early as practicable to the lowest and best bidder. The Director of Public Service of the City of Hamilton, Ohio, reserves the right to reject any or all bids.

Each proposal shall be endorsed with the title of the work, the name of the bidder and the date of its presentation.

The price in each case must be stated in both words and figures, and the bids shall be made as set out in the general specifications.

Each bidder is required to deposit with bid an affidavit of non-collusion.

Each bidder is required to deposit with his bid a certified check for an amount of not less than \$2,000, made payable without reserve to the Director of Public Service of the City of Hamilton, Ohio.

In each case where the bid is rejected, this certified check will be returned.

If one of the bids is accepted and the bidder neglects or refuses to enter into a contract with the City of Hamilton, Ohio, within ten days of the time he shall have been notified of the acceptance of same, said check shall be forfeited to the City of Hamilton, Ohio,

as ascertained and liquidated damages for failure so to do.

The successful bidder at the time of signing the contract will be required to furnish bond as provided in specifications.

Persons, firms or corporations submitting bids shall demonstrate to the satisfaction of the Director of Public Service that they have the proper equipment, expert foremen and experience to complete the contract in a proper and workmanlike manner; otherwise their bids will not be considered.

By order of the Department of Public Service.

F. J. J. SLOAT,

Director of Public Service.

C. F. ANTENEN,

Clerk, Department of Public Service.

DEPARTMENT OF THE INTERIOR WASHINGTON, D. C.

Sealed proposals in duplicate will be received at the Department until 2:00 o'clock P. M., Tuesday, November 5, 1918, and then opened, for furnishing and installation of track scale, complete, at St. Elizabeth's Hospital, Washington, D. C., in accordance with specifications, copies of which may be obtained upon application to the Chief Clerk of the Department.

S. G. HOPKINS,
Assistant Secretary.

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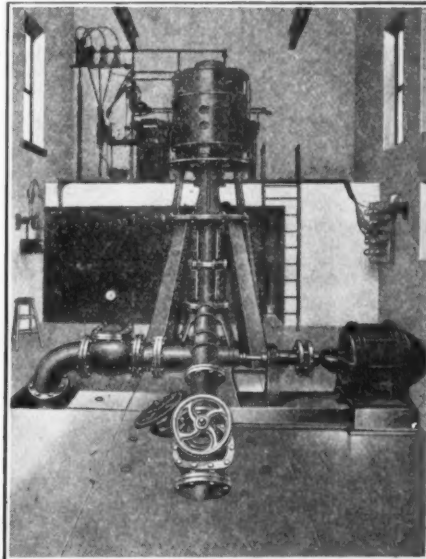
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(See Paving Machinery also.)

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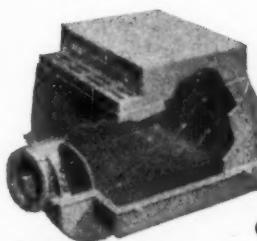
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